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CONTENTS

tioning digital society. Nevertheless, mis- and disinforming patients via social media platforms poses a real threat. Even though the number of digitally illiterate patients is shrinking, no patient should be ostracized, for such would run counter to the digitalization of society. Last, digital sovereignty has been eroded somewhat because states are barely able to ensure online security for their citizens.

Mély megrendüléssel tudatjuk, 2025. augusztus 31-én, 90 éves korában, elhunyt Dömölki Bálint (1935-2025) matematikus, a Neumann János Számítógép-tudományi Társaság tiszteletbeli elnöke, az NJSZT keretei között működő Informatikatörténeti Fórum alapítója, az első magyarországi elektronikus számítógép, az M-3 egyik építője. Az Információs Társadalom 2025. évi 1. számának történeti rovatában Képes Gábor készített vele interjút az M-3 előtörténetéről. – Az interjúból készített különlenyomatot már nem tudtuk átadni Bálintnak.

Nyugodjék békében!

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With deep sorrow, we announce the passing of Bálint Dömölki (1935-2025), mathematician, honorary president of the John von Neumann Computer Society (NJSZT), founder of the Informatics History Forum operating within the framework of the NJSZT, and one of the builders of the first Hungarian electronic computer, the M-3, on August 31, 2025, at the age of 90. In the historical section of issue No. 1, 2025 of Information Society, Gábor Képes interviewed him about the prehistory of the M-3. – Unfortunately, we were unable to hand over the special printout of the interview to Bálint.

May he rest in peace!

LECTORI SALUTEM

The editorial board welcomes the readers of the No. 2 issue of 2025.

In the first paper, Veronica Campian, Dan-Cristian Dabija, Elena-Mădălina Vătămănescu, and Gandolfo Dominici examine the role of teaching staff in enhancing students' future intended use of e-learning management systems. Following an online survey of 250 students and the use of structural equation modeling, the findings confirm the critical role of teaching staff's involvement in fostering knowledge exchange and shaping students' long-term intentions to use e-learning platforms.

Next, Máté Julesz discusses digital society and AI, with a special focus on healthcare. The article highlights the ethical and regulatory implications arising from this progress, particularly regarding the right to healthcare as a social human right. It notes that while legal norms are necessary, humanity's future will be marked by regulatory minimalism, and that codes of conduct for AI use in healthcare should be strengthened.

Primož Krašovec analyzes the AI effect, which is the denial of AI's intelligence. The article explains that because the human mind experiences its own intelligence as self-awareness, it cannot help but tie any intelligence to self-awareness. The paper presents the AI effect as an ethical issue and analyzes a characteristic case: the retroactive denigration of AlphaGo.

Following this, Gergely Ferenc Lendvai, János Tamás Papp, and Gergely Gosztonyi address the mitigation of harmful content on social media through platform regulation, focusing on the Digital Services Act (DSA). The DSA (mostly) holds online platforms liable for content they publish and imposes requirements that they mitigate and remove harmful content. The authors critically question how such a legal document can mitigate the severe societal and psychological dangers of social media abuse or combat local disinformation campaigns.

Finally, Gábor Andrási and Éva Réka Keresztes present a case study on integrating online simulations in business education. The article focuses on developing decision-making skills at the master's level at the Budapest University of Business and Economics. It argues that computer-based simulations bridge the gap between theory and practice, enhancing employable skills such as teamwork, problem-solving, and communication. The findings show that well-designed simulations support the development of decision-making skills and critical thinking.

We wish you a pleasant reading.

VERONICA CAMPIAN, DAN-CRISTIAN DABIJA,
ELENA-MĂDĂLINA VĂTĂMĂNESCU,
GANDOLFO DOMINICI

Teaching staff's role in enhancing students' future intended use of e-learning management systems

This article examines how teaching staff's involvement influences the effectiveness of e-learning management systems and students' future intentions to use those platforms. Following an online survey of 250 students, structural equation modeling was performed to analyze the relationships between teaching staff's involvement, knowledge exchange, and students' future intentions to use e-learning platforms. The model explained more than 65% of the variance in future use intention and nearly 60% of the variance in knowledge exchange. In validating the proposed model, the findings confirm the critical role of teaching staff's involvement in fostering knowledge exchange and shaping students' long-term intentions to use e-learning platforms. Educators and institutions can leverage the findings to enhance e-learning systems by fostering greater engagement among teaching staff, improving knowledge exchange, and sustaining students' commitment to using those platforms.

Keywords: *e-learning platform, knowledge exchange, future use intention, e-learning management system, user-friendliness, teaching staff*

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1. Introduction

The rapid onset of the COVID-19 pandemic prompted a sudden shift toward e-learning that forced educational institutions to quickly innovate and adjust to new conditions. In turn, changes in the online teaching and learning process became necessary (Vătămănescu et al. 2023). Students who were directly impacted have since been challenged to demonstrate their inclination to utilize e-learning platforms in order to attain their individual ambitions and educational aims, particularly when being physically present on campus was restricted, if not impossible (Nikou and Maslov 2021). In the so-called new normal, education has assumed a hybrid form in which both students and teachers drew from their knowledge, experiences, and use of online tools during the pandemic (Pishchukhina, Gordieieva and Rainer 2024), all of which facilitated their use of different online learning platforms as well (Csorba and Dabija 2024; Mineshima-Lowe et al. 2023).

In the past few years, e-learning has emerged as a marker of significant innovation and progress in education (Martínez-Cerdá, Torrent-Sellens and González-González 2020), one that offers students comfort, lower costs, and a high degree of flexibility (Salloum et al. 2019). Among the other advantages of e-learning is student autonomy during the teaching–learning process and new forms of peer interaction (Valencia-Arias et al. 2019). Online teaching has not only engendered fundamental transformations in education but also changed how teaching and educational communication are envisioned (Deshwal, Trivedi and Himanshi 2017; Fülöp et al. 2022).

The implementation of e-learning in higher education institutions has facilitated synchronous and asynchronous teaching–learning activities between teachers and students, along with the identification of the tools necessary for students to do so and the fulfillment of their desires related to learning (Fülöp et al. 2023). At universities in particular, e-learning has emerged as one of the most developed, important directions for strategic development (Gros and García-Peñalvo 2023; Nugroho, Setyorini and Novitasari 2019), because it facilitates students' access to education regardless of their location.

Nevertheless, the efficacy of implementing e-learning depends heavily on the way in which education is conducted online, the disposition and engagement of instructional personnel, their endeavors to offer guidance and furnish feedback to learners, the approach employed in delivering online activities, and their capacity to inspire students to enroll in online courses (Cholyshkina et al. 2024; Keržič et al. 2021). Universities, for example, should provide students with applications that are easy to use as well as support and motivate students and teachers to use e-learning facilities and tools to optimize their performance (Abbad 2021). The success of any e-learning system also depends on the degree of acceptance among users, be they students, teachers, or administrative staff (Elneel et al. 2023). In that context, students' satisfaction is fundamental, given its identified role in learning efficiency due to boosting the use and acceptance of technology on which teaching–learning through e-learning systems is based (Navimipour and Zareie 2015). It may also catalyze knowledge sharing among peers.

Among the COVID-19 pandemic's unprecedented effects, it greatly influenced the application of the technology acceptance model at universities (Bamufleh et al. 2020). Briefly described, the technology acceptance model predicts how users accept and use technology based on two specific factors: perceived usefulness and perceived ease of use. During the pandemic, students and teachers gained robust experience with using online digital learning technology while being dependent upon it. Amid the sudden shift to remote learning, universities and students had to adapt swiftly (Djokic et al. 2024; Petchamé et al. 2023), and universities in particular had to ensure that their digital learning technology was user-friendly enough to facilitate smooth transitions to the new normal. To that end, significant effort was put into improving such technology's perceived ease of use. Meanwhile, the technology's perceived usefulness also had to be actively stimulated due to the abrupt and necessary transition to online learning. In the process, universities also had to improve and expand their digital infrastructure in order to support heavy digital traffic and the intensified reliance on technology. Ensuring digital infrastructure's performance not only involved smooth functioning but also making students perceive technology as being reliable and necessary (Mihai et al. 2024; Petchamé et al. 2023). Because those issues impact stakeholders to different extents depending on the university's infrastructure, preparedness, and digital literacy, investigating students' intention to use e-learning platforms in the future based on teaching staff's involvement, the digital platforms available, their user-friendliness, and students' propensity toward knowledge exchange is a worthwhile endeavor.

Against that background, this article probes students' perceptions across diverse faculties within the same university. It also investigates how the institution has actively fostered knowledge exchange by engaging teaching staff in e-learning. Beyond that, it delves into students' perspectives on their capacity to learn and assimilate information through e-learning. Last, taking a forward-looking approach, it examines students' future intentions to embrace digital platforms in the new normal and the ever-evolving landscape of education technology.

As presented in this article, we conducted a study in one of Romania's most complex universities as a representative example of higher education in Eastern Europe. The university was able to rapidly respond to the challenges posed by the COVID-19 pandemic by transitioning to an exclusively online learning and teaching environment. Thus, in the postpandemic period, many of the experiences and best practices gained were further developed. E-learning, facilitated through diverse platforms incorporating robust learning management systems (LMSs), emerged as a pivotal aspect, one that offered users several options. Our findings stem from a questionnaire-based survey with 250 students conducted in late 2024, data from which were processed and analyzed in structural equation modeling (SEM) involving partial least squares.

As for the novelty of our findings, whereas past studies have examined the COVID-19 pandemic's impact on teaching and learning and the measures imposed as a result, including the immediate and complete closure of educational institutions to allow social distancing (Bamufleh et al. 2020; Petchamé et al. 2023), our research returns students to the fore as the chief stakeholders of education and, in turn, the changes brought about in the new normal. Our findings emphasize students'

perceptions of how the university and teaching staff managed to deliver and share knowledge in the new normal and their perceived capitalization of the online infrastructure and resources to actively support peer-to-peer knowledge exchange. Students' learning experiences improved due to both their perceptions of the inherent, sometimes tangible benefits of using e-learning platforms and their sense of social presence. In turn, their strategic use of LMSs also motivated them to increase their efforts in pursuing higher education.

In the remainder of this article, we first review relevant literature, elaborate our hypotheses, and present our conceptual model. Next, we describe our methodology and data analysis using SEM, after which we detail and interpret our results. In conclusion, we present our study's theoretical and practical contributions and its limitations.

2. Literature review and hypotheses development

The term *e-learning* describes various digital learning environments (Giannakos, Mikalef and Pappas 2021) involving not only computer-assisted teaching but also interactive learning (Lara, Aljawarneh and Pamplona 2020). E-learning requires various tools and multimedia technology to produce and improve the quality of educational materials and thus contribute to the acquisition and sedimentation of participants' knowledge (Navimipour and Zareie 2015). A major advantage of e-learning is that the time and location of the teaching–learning process becomes exceptionally flexible and adaptable. Although e-learning facilitates an increase in the quality of education in many ways, it is deficient in practical activities, and its major shortcoming is a lack of interpersonal interaction (Maatuk et al. 2022).

Today's teaching–learning processes seldom occur without e-learning systems. Among the teaching–learning platforms most frequently used by educational institutions are Blackboard, Canvas, Teams, and Moodle (Cramarenco, Burcă-Voicu and Dabija 2023), which support and improve innovative teaching–learning processes for students and other stakeholders, including teachers and staff. Depending on their characteristics and functionalities (Giannakos, Mikalef and Pappas 2021) e-learning systems can be categorized as computer-based training, web-based e-learning, and LMSs (Nugroho, Setyorini and Novitasari 2019, 83), the latter of which are especially widespread, highly regarded, and greatly appreciated. LMSs host virtual classes in which a teacher or teaching staff manages a course, which allows the collaboration and active involvement of participants (Giannakos, Mikalef and Pappas 2021). A particularly well-known open-source LMS is Moodle, which occupies approximately 50% of the global e-LMS market and boasts approximately 155,000 active sites registered in 239 countries (Moodle 2024). e-LMSs also provide forums that facilitate interactions and exchanges between teachers and students. Perhaps above all, e-LMSs afford a high level of flexibility due to being accessible almost entirely regardless of place or time, which stakeholders generally find to be highly valuable (Elneel et al. 2023).

Before the COVID-19 pandemic, teaching–learning in higher education occurred almost exclusively in a face-to-face format, often accompanied and/or supported

by digital platforms (Daumiller et al. 2021; Szabó et al. 2022), especially in blended learning or massive open online courses (Cramarenco, Burcă-Voicu and Dabija 2023). In response to the global shutdown of face-to-face teaching and learning at the beginning of the health crisis, a rapid transition from traditional teaching–learning methods to e-learning occurred that resulted in a profound transformation in the communication and interaction dynamics between the teaching staff and course participants (Kulikowski, Przytuła and Sułkowski 2022). The abrupt shift posed unforeseen challenges and marked a significant departure from established educational norms. Faced with unprecedented challenges, educators and students had no choice but to urgently adapt to the new educational landscape.

To achieve their personal goals and educational objectives, students directly affected by emergent developments demonstrated their willingness to use e-learning platforms in the new normal of the postpandemic period, especially having gained ample experience during the pandemic (Castro 2023). In general, success in implementing e-learning largely depends on whether education is entirely online or hybrid, the teaching staff's attitude and involvement, their efforts in guiding students and providing them feedback, the ways that they teach online activities, and their ability to motivate students to take online courses (Keržič et al. 2021). Along those lines, we first hypothesized that:

H_1: Teaching staff's involvement positively influences e-LMSs.
H_2: Teaching staff's involvement positively influences e-learning platforms.
H_3: Teaching staff's involvement positively influences the user-friendliness of e-learning platforms.
H_4: Teaching staff's involvement positively influences the exchange of knowledge on e-learning platforms.

Universities represent a favorable framework for digital and sustainable development given their educational strategies, implementation of teaching–learning activities, and well-defined educational measures and tactics, all of which offer students and stakeholders relevant models to follow (Fülöp et al. 2022). Therefore, e-learning platforms are user-friendly environments that are regarded as sustainable in education due to facilitating new possibilities for learning and innovation (Dabija et al. 2023; Donath, Mircea and Rozman 2020). Such green e-learning platforms have reduced CO2 emissions caused by the transport of students to campus (Aghamolaei and Fallahpour 2023). E-learning is also a paper-free learning method, which helps to reduce the manufacture of cellulose, a major source of air pollution, and does not require physical textbooks; instead, e-books can be accessed from electronic libraries, downloaded, and updated by the publishers as necessary (Amarneh et al. 2021). Thus, we additionally hypothesized that:

H_5: Green e-learning platforms positively impact e-LMSs.
H_6: Green e-learning platforms positively impact the user-friendliness of e-learning platforms.
H_7: Green e-learning platforms positively impact future use intention.

In general, LMSs facilitate the intertwining of classical teaching techniques with digital learning, thereby offering students personalized e-learning opportunities (Gligorea et al. 2023). Moodle is the most popular, widely accepted open-source LMS in educational institutions, organizations, and society at large (Altinpulluk and Kesim 2021; Dominek et al. 2023). In fact, considering students' performance via LMSs, scholars (Bessadok, Abouzinadah and Rabie 2023) have recently recommended using Moodle, for it confers exceptionally strong results. Owing to its functionalities, Moodle can facilitate the learning process in various ways (Gamage, Ayres and Behrend 2022). It supports teachers' creativity in developing educational materials, allows the creation of quizzes and multiple-choice questions, offers automatic scoring, and facilitates feedback. A user's positive experience and ease of use with e-learning systems both drive students' satisfaction and largely determine their degree of acceptance of the platform (Miya and Govender 2022). For those reasons, we added the following hypotheses as well:

H_9: The user-friendliness of e-learning platforms positively influences knowledge exchange through them.

H_{10}: The user-friendliness of e-learning platforms positively influences future use intention.

Although interactions in e-learning systems do not take place in real time in a formal context, they nevertheless allow students to share knowledge gained with peers through a socialization process (Muhisn et al. 2019). Thus, the acquisition, exchange, and sharing of knowledge and the collaboration between interested parties are essential elements in e-learning that stimulate not only learning but also the creativity of participants (Abdekhoda, Pourrasmi and Ranjbaran 2023; Mutale 2025). Whereas *knowledge acquisition* describes the acquisition and development of new knowledge based on existing information, *knowledge sharing* involves sharing knowledge, skills, and/or experiences with others (Dabija et al. 2024; Vătămănescu et al. 2023).

Given the added value that Moodle generates for the learning process, students have expressed their intention to use Moodle in the future and been inclined to recommend it (Hasan 2021). Good interactions with teachers, educational support, and knowledge exchange with peers, as well as the improvement of skills, are all key elements that encourage students to use online platforms in the future (Nguyen and Tran 2022). Thus, we also hypothesized that:

H_{11}: Knowledge exchange on e-learning platforms positively influences students' future use intention regarding the platforms.

Drawing on theoretical advancements, our study's conceptual model appears in Figure 1, which specifies the vectors that promote knowledge exchange on e-learning platforms.

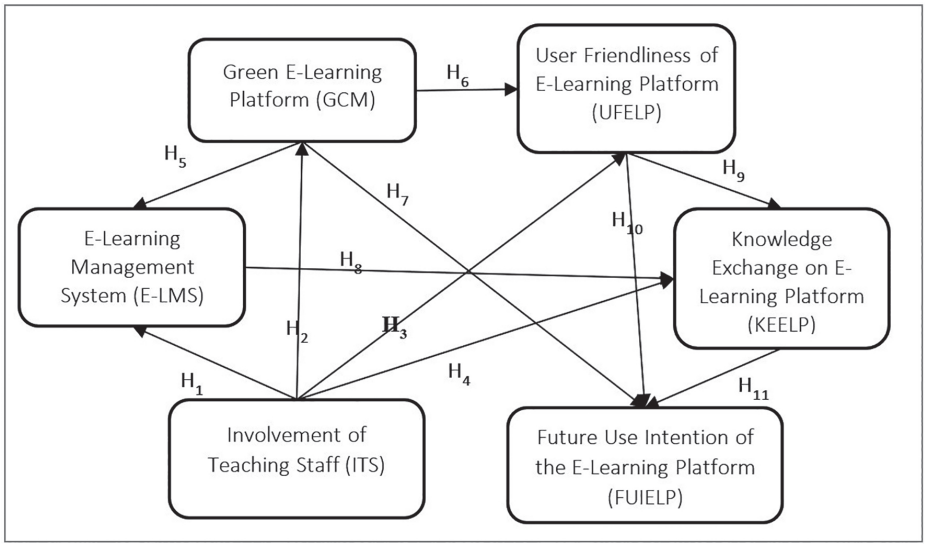

Figure 1. Model of students' future use intention regarding e-learning platforms

2. Methodology

2.1. Research design, sampling, and data collection

Our research involved evaluating the extent to which students' future use intention regarding e-learning platforms is enhanced based on their previous experience with them under the influence of the e-LMS, knowledge of green e-learning platforms, the user-friendliness of those platforms, and knowledge exchange. To that end, an empirical investigation was conducted using a quantitative online survey among students from various faculties, all recruited via convenience sampling, who shared their perceptions of and knowledge about using e-learning platforms in university education. Ultimately, 250 students participated: 124 (49.6%) bachelor's students and 126 (50.4%) master's students (Table 1). The research was conducted in late 2024, and all participants had previous knowledge of using different e-learning platforms.

2.2. Evaluation of the measurement models

The analysis of the conceptual model and hypotheses was performed using SEM in SmartPLS 3.0 (Ringle, Wende and Becker 2024). All dimensions of the reflective conceptual model were tested in terms of item loadings, validity, internal consistency, average variance extracted (AVE), and reliability indicators; values exceeding the required thresholds appear in Table 2. Subsequently, discriminatory validity testing

using the recommended criteria in the literature was performed (Hair, Black and Babin 2010), namely the Fornell–Larcker criterion and the heterotrait–monotrait criterion. The results appear in Tables 3 and 4.

	Bachelor's		**Master's**		**Total**	
	n	%	*n*	%	*n*	%
Economic sciences	68	27.2	54	21.6	122	48.8
Other faculties	56	18.4	72	28.8	118	51.2
Millennial	44	17.6	25	10.0	69	27.6
Generation Z	80	32.0	101	40.4	181	72.4
Man	32	12.8	29	11.6	61	24.4
Woman	92	36.8	97	38.8	189	75.6
Full-time	59	23.6	116	46.4	175	70.0
ID or IFR	65	26.0	10	4.0	75	30.0
Total	124	49.6	126	50.4	250	100.0

Note. ID: long-distance education (bachelor's); IFR: low-frequency education (master's).

Table 1. Sociodemographic characteristics of the sample

As shown in Table 2, all item loadings exceeded the minimum requirement threshold of 0.7 recommended in the literature, which confirmed that the measurements used had convergence validity (Hair, Black and Babin 2010), with values ranging from 0.708 to 0.951.

Item	**Measure**	**Loading**	**α/AVE/ CR**
E-Learning Management System (ELMS) adapted from Navimipour and Zareire (2015) *The educational platform (Moodle) used...*			
E-LMS1	...is always fully functioning.	0.892	0.860/ 0.779/ 0.914
E-LMS2	...is always available.	0.879	
E-LMS3	...facilitates learning.	0.877	
Green E-Learning Platform (GELP) adapted from Navimipour and Zareire (2015) *The educational platform (Moodle) used...*			

GELP1	...facilitates the reduction of paper consumption through the online submission of projects.	0.721	0.884/ 0.633/ 0.912
GELP2	...contributes to the conservation of environmental resources	0.818	
GELP3	...facilitates socially responsible consumption.	0.853	
GELP4	...contributes to the reduction in the consumption of energy and resources.	0.766	
GELP5	...is a green way of learning.	0.800	
GELP6	...is a sustainable manner of learning.	0.808	
User Friendliness of E-Learning Platform (UFELP) adapted from Navimipour and Zareire (2015) *The educational platform (Moodle) used...*			
UFELP1	...is user-friendly.	0.834	0.852/ 0.695/ 0.901
UFELP2	...facilitates the uploading of assignments.	0.872	
UFELP3	...facilitates receiving feedback from the lecturer.	0.866	
UFELP4	...eases online examination.	0.757	
Knowledge Exchange on E-Learning Platform (KEELP) adapted from Navimipour and Zareire (2015)			
KEELP1	The discussion forums of the educational platform (Moodle) help me master my coursework/content.	0.813	0.856/ 0.636/ 0.897
KEELP2	Work groups on the educational platform (Moodle) facilitate learning.	0.855	
KEELP3	I am motivated to use the educational platform (Moodle).	0.835	
KEELP4	Tasks/assignments are easy to perform on the educational platform (Moodle).	0.708	
KEELP5	I use the educational platform (Moodle) to keep my knowledge up to date.	0.768	
Involvement of Teaching Staff in the New Normal (ITS) adapted from Abbad (2021) *In the new normal, the teaching staff has...*			
ITS1	...always provided enough learning materials.	0.747	0.900/ 0.667/ 0.923
ITS2	...provided feedback when I have needed it.	0.848	
ITS3	...disseminated homework and materials in time for each course.	0.849	
ITS4	...been open to suggestions on how to organize online courses.	0.814	
ITS5	...informed the class about grades and points earned during the semester.	0.800	
ITS6	...informed the class about the examination procedure.	0.837	

Future Use Intention of the E-Learning Platform (FUIELP) adapted from Abbad (2021) *In the future, I will…*			
FUIELP1	…use the educational platform (Moodle).	0.951	0.921/ 0.636/ 0.897
FUIELP2	…use the educational platform (Moodle) more often.	0.922	
FUIELP3	…recommend the educational platform (Moodle) to others.	0.914	

Note. α: Cronbach's alpha; AVE: average variance extracted; CR: composite reliability.

Table 2. Constructs and items

The reliability of the constructs in the conceptual model was tested using Cronbach's α > 0.7 according to recommendations in the literature (Henseler and Sarstedt 2013). Per the values shown in Table 2, all constructs met the minimum requirement threshold, with Cronbach's α values exceeding 0.7, and the AVE exceeded the recommended threshold of 0.5, thus indicating the accuracy and adequacy of the measurement model (Chin 1998) and the convergent validity of the constructs. Composite reliability also exceeded the threshold of 0.7 specified in the literature (Hair, Black and Babin 2010); thus, the constructs were considered to be reliable.

Construct	ITS	GELP	E-LMS	FUIELP	KEELP	UFELP
	Fornell–Larcker criterion					
ITS	**0.817**					
E-LMS	0.557	**0.883**				
FUIELP	0.533	0.568	**0.929**			
GELP	0.433	0.591	0.466	**0.796**		
KEELP	0.615	0.656	0.789	0.584	**0.797**	
UFELP	0.550	0.700	0.667	0.749	0.704	**0.833**
ITS						
E-LMS	**0.630**					
FUIELP	0.606	**0.627**				
GELP	0.477	0.657	**0.512**			
KEELP	0.701	0.752	0.881	**0.667**		
UFELP	0.622	0.808	0.750	0.856	**0.822**	

Note. GELP: Green E-Learning Platform; LMS: Learning Management System; UFELP: User Friendliness of E-Learning Platform; KEELP: Knowledge Exchange on E-Learning Platform; ITS: Involvement of Teaching Staff; FUIELP: Future Use Intention of the E-Learning Platform.

Table 3. Testing discriminant validity

Each construct's discriminant validity was assessed both the Fornell–Larcker and heterotrait–monotrait criteria, as detailed in Table 3. According to the Fornell–Larcker criterion, the AVE for each latent variable needs to exceed the correlation coefficient between the construct and all other distinct variables. To guarantee that the constructs were conceptually dissimilar, we employed the heterotrait–monotrait criterion, with a threshold of 0.9 (Henseler, Ringle and Sarstedt 2014). The outcomes, shown in Table 3, depicting the results of discriminant validity analyses using both criteria, confirm that the suggested threshold values were achieved and that both constructs had discriminant validity.

When the dataset was analyzed for collinearity, the variance inflation factor for all indicators was less than 5, which is the threshold for collinearity analysis (Sarstedt et al. 2017). The highest value was 4.754 (FUIELP1), which indicates no multicollinearity. To examine the relationships between the latent variables, a bootstrap procedure was employed, and 11 of the 12 hypotheses were accepted as having significant positive relationships based on *t* statistics.

3. Results

To accurately assess the structural model, we analyzed the correlations between the constructs with particular emphasis on the potential problem of collinearity. For the inner model (i.e., UFELP → FUIELP), the variance inflation factor of 3.020 was one of the highest but remained below the threshold value, meaning that no multicollinearity existed among the constructs. Moreover, the goodness of fit of the saturated model was satisfactory, with a square root mean residual value of 0.064, which adhered to the recommended criteria of <0.08.

The teaching staff's involvement explained 18.7% of the variance in the green e-learning platform ($R2 = 0.187$), whereas the same construct along with the green e-learning platform explained 46.1% of the variance in the e-LMS ($R2 = 0.461$). 62.4% in the variance of the user-friendliness of e-learning platform ($R2 = 0.624$) is explained by the teaching staff's involvement in the new normal and the green e-learning platform, while 59.5% in the variance of the knowledge exchange on e-learning platform ($R2 = 0.595$) is explained by the user-friendliness of e-learning platform, the e-LMS, and the teaching staff's involvement. Last, 65.8% of the variance in the future use intention of the e-learning platform ($R2 = 0.658$) was explained by knowledge exchange on the e-learning platform, the user-friendliness of the e-learning platform, and the green e-learning platform, for a structural model with altogether moderate to strong predictive power (see Figure 2). The effect size $f2$ (≥0.35) with a value of 0.425 indicated the model's large effect (Chin, 1998).

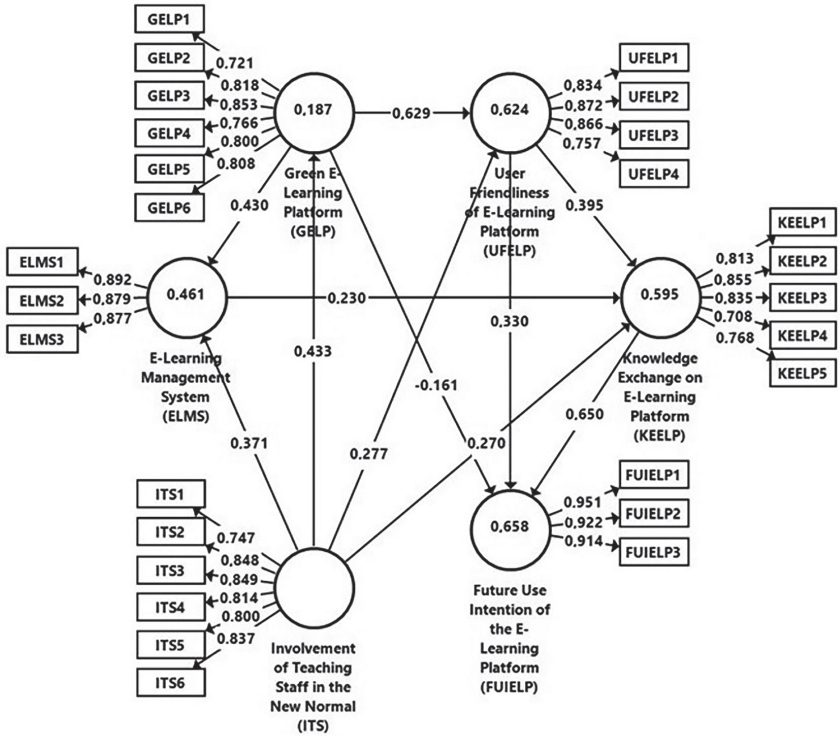

Figure 2. Structural model

Table 4 presents the results of hypotheses testing and the additional metrics supporting their validation.

Paths	Path coefficient	*SD*	*t*	CI (97.5%, 2.5%)	*p*	Hypothesis
CITS → E-LMS	0.371	0.068	5.456	0.248, 0.489	0.000***	H_1, supported
CITS → GELP	0.433	0.057	7.628	0.331, 0.553	0.000***	H_2, supported
CITS → UFELP	0.277	0.054	5.121	0.161, 0.375	0.000***	H_3, supported
CITS → KEELP	0.270	0.061	4.438	0.155, 0.387	0.000***	H_4, supported
GELP → E-LMS	0.430	0.058	7.379	0.324, 0.522	0.000***	H_5, supported
GELP → UFELP	0.629	0.047	13.294	0.527, 0.719	0.000***	H_6, supported

GEL → FUIELP	−0.161	0.070	2.298	−0.324, −0.023	0.022**	H_7, supported
E-LMS → KEELP	0.230	0.068	3.362	0.098, 0.357	0.001***	H_8, supported
UFELP → KEELP	0.395	0.057	6.960	0.290, 0.508	0.000***	H_9, supported
UFELP → FUIELP	0.330	0.084	3.913	0.166, 0.501	0.000***	H_{10}, supported
KEELP → FUIELP	0.650	0.060	10.788	0.535, 0.762	0.000***	H_{11}, supported

Note. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.001$; CI: confidence interval; GELP: Green E-Learning Platform; LMS: Learning Management System; UFELP: User Friendliness of E-Learning Platform; KEELP: Knowledge Exchange on E-Learning Platform; CITS: COVID-19 Involvement of Teaching Staff; FUIELP: Future Use Intention of the E-Learning Platform.

Table 4. Path coefficients of the structural equation model

H_1 hypothesized that the teaching staff's involvement in the new normal positively influences the e-learning management system. Recent studies (Abbad 2021) have revealed that the teaching staff's involvement and the acceptance of e-learning systems can positively affect the entire university system, for it can increase the investment of higher education institutions in such systems. Meanwhile, universities and teaching staff that are innovative will use those systems to adapt their teaching methods (Obidovna 2023). The results (Table 4) prove the strong positive, significant meaning of the relationship; therefore, **H1** was supported.

H_2, meanwhile, proposed that the teaching staff's involvement in the new normal positively influences the green e-learning platform. That dynamic was confirmed by the results (Table 4), which showed a meaningful positive significant relationship; therefore, **H2** was supported. The use of e-learning platforms can be enhanced by teaching staff's participation, which can result in personalized educational experiences for learners, promote innovative teaching methods, and encourage creativity. Such pedagogical advancements can play a role in creating more sustainable, transformative educational experiences (Mashroofa et al. 2023).

H_3 began with the premise that the teaching staff's involvement positively impacts the perceived user-friendliness of e-learning platforms. That relationship was confirmed by the strong significant influence of XXX and thus the acceptance of **H_3**. A key factor in the use of e-learning is the role of teaching staff, who need to be creative in their approaches, styles, and ways of teaching (Ahmed et al. 2021). Being communication-oriented, e-learning platforms enable easy communication supported by technology, which empowers teachers to use all the resources and facilities available to execute their teaching with the support of technology (Ahmed et al. 2021; Corrin et al. 2024).

H_4 expected that the teaching staff's involvement would positively impact knowledge exchange on e-learning platforms. The outcomes (Table 4) demonstrated a strong, significant positive relationship between the constructs, which lent support to **H_4**. Those findings align with the results of Ahmed et al. (2021) and Ngoc Hoi (2023), who have suggested that innovative teaching practices can enhance students' engagement and involvement in online learning, knowledge sharing, and the exchange of information.

Next, **H_5** proposed that green e-learning platforms positively impact the perception of the e-LMS used. The results (Table 4) revealed a strong, significant positive correlation, which confirmed **H_5.** Beyond that, **H_6** postulated that green e-learning platforms positively impact the perceived user-friendliness of those platforms, which was confirmed by results revealing a strong, positive association that supported **H6.** Those results corroborate the findings of Falola et al. (2022), who showed that e-learning platforms play a pivotal role in fostering social and environmental sustainability. The role also implies a reduction in detrimental emissions generated by transport and travel, for students can access virtual courses remotely without the need to commute to campus. On top of that, universities can reduce energy, electricity, heating, and cooling expenses by eliminating the need for students to travel to campus (Pujani, Akbar and Nazir 2023). In virtual classes, teachers and students use readily accessible, user-friendly online materials, which reduces paper waste and supports universities' environmental sustainability initiatives.

H_7 considered the influence of green e-learning platforms on generating students' future use intention regarding the platforms. The results ($\beta = -0.161$, $t = 2.298$, $p = 0.022$) support that assumption, thereby suggesting that the relationship is significant, albeit to a lesser extent, and permits the acceptance of **H_7**. The weaker effect observed in H7 stemmed from the fact that respondents likely did not truly comprehend or were not fully aware of the features of such platforms despite being eager to use it, for it was often imposed by the faculty. Because using such a platform was therefore required, and because there were likely no alternatives, students might have been less aware of the fact that by using such platforms, their behavior was necessarily greener and/or more socially and/or environmentally responsible. Our findings thus complement prior developments in the field (Fülöp et al. 2023), which have showcased the benefits yielded by online education in terms of reduced CO2 emissions engendered by the lack of students' transportation to university venues.

H_8 was based on the premise that e-LMSs foster knowledge exchange on e-learning platforms. The results (Table 4) confirmed a strong, significant influence between the concepts, which validated **H_8**. The benefits of e-LMS that lead to knowledge sharing are highlighted in the literature (Ndou, Mashau and Chigada 2023), which highlights that e-LMSs promote education without borders, allow students and teachers to access education, and are accessible and user-friendly. e-LMSs allow interaction through chatrooms and forums, among other features, in which students and the teaching staff can post topics, host exchanges, and share knowledge. Next, **H_9** considered how the user-friendliness of e-learning platforms influences knowledge exchange through such platforms, which was supported by a strong, positive significant relationship. Therefore, **H9** was accepted. Those results align with other

findings in the literature (Khan et al. 2020; Zheng et al. 2025), which reveal that students choose e-learning platforms because the platforms afford them the freedom to connect with teachers and peers and to exchange information. The ease of accessing resources for study motivates students to adopt e-learning technology, which results in their positive attitude toward e-LMSs.

$\mathbf{H_{10}}$ considered the effect of the perceived user-friendliness of e-learning platforms on students' future use intention, and the results ($\beta = 0.330$, $t = 3.913$, $p < 0.000$) showed a strong significant influence, which supported the acceptance of $\mathbf{H_{10}}$. Last, $\mathbf{H_{11}}$ considered the impact of knowledge exchange via e-learning platforms on students' future use intention, and the results (Table 4) indicated an exceptionally strong, significant influence, which validated $\mathbf{H_1}$**1. The** literature (Gamage, Ayres and Behrend 2022) suggests that LMSs have many functions that promote creativity in instructors such that they engage students in e-learning, including Moodle's ability to generate quizzes and multiple-choice questions and to provide automatic scoring and feedback. A positive user experience with e-learning systems contributes to the higher acceptance of learning platforms in general (Miya and Govender 2022). Indeed, students acknowledged the benefits of Moodle's e-learning system and reported intending to use and recommend it in the future (Nguyen and Tran 2022).

4. Discussions and conclusions

4.1. Summary of the findings and originality inputs

Our empirical research has generated several straightforward findings that are worth analyzing. First, the proposed model explained more than 65% of the variance in the future use intention of the e-learning platform by students and nearly 60% of the variance in the knowledge exchange on the platform. That evidence confirms the model's substantiality and significantly complements the validation of all relationships inferred. Therefore, our study highlighted the multifaceted advantages of embracing e-learning systems, including in theoretical, pedagogical, environmental, and professional dimensions.

From a theoretical standpoint, we envisioned a six-factor model meant to capture the way in which the teaching staff's involvement could enable knowledge exchange on e-learning platforms and, more notably, students' future use intention of the platform, thereby acknowledging the driving influence of e-LMSs, green e-learning platforms, and the user-friendliness of e-learning platforms. The conceptual framework is compelling and comprehensive and delves into the underlying connections among constructs from a novel perspective, while simultaneously investing into the literature a phenomenological view of the unprecedented crisis generated by the COVID-19 pandemic in the realm of education.

From practical and educational perspectives, the implications of our results are manifold. For one, they indicate a significant shift from traditional teaching methods to online platforms as a viable substitute for face-to-face instruction. The urgent shift to e-learning platforms has empowered students to pursue their studies remotely.

The findings showed that the teaching staff's involvement has been influential in facilitating the shift toward the online environment. Furthermore, e-learning systems have demonstrated numerous advantages in facilitating knowledge dissemination among students. The accessibility of course materials at any time and location grants students remarkable convenience, particularly ones with additional obligations or who reside in geographically isolated areas. Likewise, collaborative learning is stimulated because e-learning platforms frequently include components such as discussion boards, chatrooms, and/or group projects to facilitate students' participation. Collaborative learning activities can augment comprehension and foster a sense of community among students. Users gain access to an array of worldwide resources and specialists, which enriches their educational experience in terms of breadth and depth. Individual speed of learning is also facilitated, which enables students to acquire knowledge and comprehend material more effectively and promotes more effective knowledge acquisition and improved retention.

From a professional standpoint, using e-learning platforms also aids in cultivating essential digital skills among students, which is crucial in the contemporary job market. Familiarity with various digital systems, tools, and platforms has become indispensable for work activities, thereby making experience-based training during university courses an asset in the new normal. From a sustainability-focused perspective, our study has additionally revealed that e-learning systems implicitly contribute to environmental sustainability. Digital learning platforms exhibit ecofriendly characteristics by mitigating the consumption of paper often associated with conventional classroom settings and by decreasing the pollution generated by students' transportation to campus. ChatGPT-4-based education (Peters et al., 2023) and sustainable development in universities (Lăzăroiu, 2017) integrate generative AI technology and algorithmic predictive modeling (Lazaroiu and Rogalska, 2023, 2024) for a digital twin-based, cyber–physical, and extended-reality metaverse (Lazaroiu et al., 2024) across e-learning management systems.

4.2. Limitations and directions for future research

Despite our study's noteworthy contributions, we acknowledge certain limitations that should be considered in future research. First, our sample was drawn exclusively from a single university in Romania, which potentially limited the diversity of perspectives on the examined relationships among constructs. To enhance the generalizability of our findings, future studies should broaden their scope by incorporating samples from multiple institutions, including ones beyond national borders. That approach would facilitate comparative analyses and provide more nuanced insights through in-depth investigations.

Second, the research instrument relied on self-report measures, which introduced a degree of subjectivity compared with objective metrics. Because we aimed to capture respondents' perceptions and intentions regarding social phenomena, the chosen design aligned with its purpose. On that count, future investigations should involve analyzing the actual behaviors of students measured according to objective

parameters such as online attendance rate, time spent on the platform, and access to certain online resources.

Last, future research could consider using a more representative sampling technique than convenience sampling in order to reduce potential bias and enhance generalizability. Although using self-report data is appropriate for capturing perceptions, incorporating objective use metrics (e.g., system log data or platform analytics) could strengthen the findings. Expanding the study across multiple universities and/or countries would also provide a broader perspective and validate the model in different educational contexts.

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Digital society and AI, with special reference to healthcare

The article aims to highlight the ethical and regulatory impact arising from the progress of digital society and AI, with special regard to the right to healthcare as a social human right. Digital society and AI are intricately related to healthcare and digital health literacy. Although the legal norms that guide digital society are needed to maintain the rule of law, humanity's future will be marked by regulatory minimalism. New forms of regulation should therefore be developed that can effectively prevent illegal and immoral activity in digital society. Codes of conduct on AI use in healthcare should also be strengthened. Present-day AI ethics inhibits dehumanization and promotes the cause of digital healthcare, which is imperative for an adequately functioning digital society. Nevertheless, mis- and disinforming patients via social media platforms poses a real threat. Even though the number of digitally illiterate patients is shrinking, no patient should be ostracized, for such would run counter to the digitalization of society. Last, digital sovereignty has been eroded somewhat because states are barely able to ensure online security for their citizens.

Keywords: *digital society, AI, healthcare, digital health literacy, regulatory minimalism, digital sovereignty*

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1. Introduction

In Central and Eastern Europe, the COVID-19 pandemic produced approximately 12 million new users of online services, and in the first half of 2020, the digital economy almost doubled (Piotrowska et al. 2024, 300). Those trends suggest that in times of economic and/or healthcare crises, a multitude of individuals previously lagging behind usually fall in line with the majority. Sociopsychological phenomena that trigger such developments during wartime, pandemics, and other globally transformative events have been detected in human history since long before the digital age. Because such sociopsychological drivers make people with health problems struggle more than the general population, social capital thus grows in efficacy and scale. As an antidote, the promotion of digital health literacy, as a *sine qua non* of telemedicine, boosts the defense against contamination, as the case of SARS–CoV-2 showed (Julesz 2020, 2024). Meanwhile, the outcomes of telemedicine's development during the COVID-19 pandemic have been maintained both at the global and national levels (Julesz 2022, 2023). All that serves the progress of healthcare and, resultantly, the evolution of social human rights.

The propagation of digital health literacy has been one of the most important favorable outcomes of the COVID-19 pandemic. Even though the plague in the Middle Ages and the Spanish flu in 1918–1920 caused mass death, they also contributed to human civilization. The existential need induced by the recent pandemic resulted in the birth of new telemedical technology, and in turn, digital health literacy found its way to the vast majority of citizens. In time, the role of print media in patients' health education will fade away, but the Internet will remain.

Historical turns are usually tied to catastrophic events, including pandemics. The first global stimulus to the cultural and digital progress of humanity in the 21st century happened to be the COVID-19 pandemic. To be sure, it will not be the final humanitarian crisis of the century. We can count on more. Historical memory retains methods learned about how to overcome crises and turn them to humanity's collective advantage. Digital expansion is humanity's natural answer to one of the deadliest pandemics in human history and, among its advantages, has led to digital citizenship in Hungary along with quite a few other countries.

2. Methods

The article is a review of recent literature retrieved from the Web of Science. The criteria in selecting articles were currency and relevance to digital society, digital healthcare, health mis- and disinformation, digital health literacy, and AI in healthcare and health education. The articles ultimately chosen were selected according to criticisms pro and con equally. Conclusions were drawn from the results of the articles contrasted with the personal beliefs of the author(s).

3. The need for digital society without health mis- and disinformation

Zhao et al. (2024, 9) are convinced that "healthcare providers should consider providing training programs tailored to specific sociodemographic factors to improve the ability that find and use accurate information online." Although some authors have argued that patient influencers on social media platforms "help other patients learn about disease self-management and improve their quality of life" (Willis et al. 2023, 1), others have stressed that "if those patient influencers are not qualified health professionals themselves, there is no guarantee that the complex information they are communicating has been accurately interpreted, posing a risk of misinformation spread" (Merga 2024, 490). Hussna et al. (2024, 1) contend that "throughout the COVID-19 pandemic, there was a substantial surge in the dissemination of inaccurate or deceptive information via social media platforms, particularly X (formerly known as Twitter)." I side with Azahra, Pirdaus, and Prabowo (2024, 19) in asserting that digital literacy is "very important in dealing with the spread of hoaxes and false information on social media and digital platforms." I also share the view of Falyuna et al. (2024, 69) that mis- and disinformation are caused by changes in the way that information flows and in shifts in who holds information power, as well as the fact that the world is entering a "post-truth era," among other causes. I additionally agree with Rodrigues et al. (2024, 3), who maintain that "health-related misinformation on SMPs [social media platforms] can be exploited to promote specific political narratives, exacerbating partisan disagreement amid uncertainty about information reliability." In my opinion, public health-related information is instrumental in shaping citizens' political thinking and, in turn, exerts influence on both the state and digital society. Arguably, health-related misinformation needs to be addressed to avoid political and social biases. The elimination of health-related misinformation is a question of national law and social cohesion, both of which need to support fair policy and just societies.

Török (2024, 125) suggests that state intervention against disinformation should not take the form of restrictive measures; instead, information literacy ought to be promoted. That idea notwithstanding, Hua and Shaw (2020, 10) stress the "Chinese Supreme Court's directives on fake news" and other "strict data management measures" during the COVID-19 pandemic. Nevertheless, an infodemic ran rampant throughout the world during the pandemic, including in Germany (Renninger et al. 2025, 293) and China (Hua and Shaw 2020). On the one hand, top-down measures are acceptable if they are limited to taking control of a humanitarian emergency, provided that the rule of law is fully respected. On the other, it is generally preferable to disseminate information literacy. State cooperation with society is essential; however, that relationship also shows tremendous variety between different countries with different cultures. A patient-focused dissemination of information literacy should be a common goal in all countries, and ultimately, the relevance of health-related information and that of legal information are indeed comparable. After all, patients are also citizens who avail themselves of all sorts of information.

Zhang and Liu (2023, 8–9) highlight that "social networks make it much easier for many people, particularly non-Internet users, to acquire high-quality health

information." Indeed, the credibility of health information is highly relevant. When a proxy seeks health information online on a patient's behalf, the patient might be exposed to the threat of negligently conveyed information that is hazardous to their health. Nevertheless, I agree with Bober et al. (2024, 6), who argue that "patients with limited technology experience are often able to complete a telehealth visit with the help of a family member, friend or caregiver."

Arguably, social trust is strongly tied to institutional trust. Digitally illiterate patients only exhibit social trust if they also exhibit institutional trust. Digital illiteracy marginalizes individual without access to the Internet and/or ones who have not been acculturated to the legal and cultural norms of digital society. With time, that social stratum will narrow and ultimately vanish. However, no society should leave that already marginalized stratum on the sidelines. Even if they will ontologically disappear, such behavior would dehumanize digital society and run counter to the essential characteristics of a society based on information and communication technology (ICT). After all, ICT is designed for humanity's benefit; it is ICT that serves humankind, not the other way around.

4. Pros and cons of AI with special regard to healthcare and health education

Even if the greatest threat posed by digital society is the possible factor of dehumanization, emerging novelties, including digital patient twins, indisputably serve human beings (Katsoulakis 2024). Digital twins have recently appeared in healthcare to safeguard health and reduce costs for both patients and providers. A digital simulation of the patient is the best way to protect a human being by testing healthcare solutions and methods on their digital twin. Far from dehumanizing patients, digital twins are subordinated to patients' best interests. As human beings, patients should always be paramount; thus, a patient's digital copy needs to have the biological characteristics of that patient, although the first aim is to serve the patient as a living person. Moreover, the patient needs to be informed of the threats and opportunities of having a digital twin, and the patient's informed consent is required even if it necessitates a certain level of digital health literacy. However, that criterion may lead to the social exclusion of patients with insufficient digital health literacy.

At any rate, patient-based digital healthcare is supposed to be largely inclusive. Digitally illiterate patients ought to be offered all necessary human- and ICT-based help to remain part of digital society. Lazic, Simovic, and Domazet (2024, 1623) maintain that "citizens who lack digital skills and competences have limited access to knowledge acquisition and tend to be among those of lower socioeconomic status." Zervas et al. (2024, 1), in examining the use of digital currencies, observe that "digital skills effectively contribute to the development of digital societies." I believe that both digital healthcare and transactions performed with digital currency stress the significance of digital literacy in contemporary societies. Digital society's several facets also demonstrate the relevance of digital literacy and confirm the disintegrating consequences of the lack thereof.

GPT 4.0, a "generative pre-trained transformer," makes it possible for healthcare students (e.g., future physicians and nurses) to practice on AI without endangering living patients. For example, students become competent in establishing healthcare documentation. Because today's healthcare students have been socialized in a digital world, it is more effective for them to polish their skills on nonliving AI and to later use their experience to treat living patients in real life. GPT 4.0 was launched in 2024, and similar new technology is in development. Such technology safeguards human health and life while at once promoting health education (Horváthné Kónya et al. 2024). According to Cholyshkina et al. (2024, 40), "The use of ChatGPT-like applications can reduce the spread of cheating in education, which involves writing assignments for money." GPT 4.0 and similar technology likewise serve to draw in university lecturers who are digital immigrants, and their inclusion is based on student–lecturer cooperation. Indeed, it is not enough to involve students in digital healthcare education; engaging older lecturers is also important to build a digital society with digital healthcare. Ultimately, the gap between Gen Z students and older lecturers should be bridged; otherwise, it might pose the risk of social incongruence, which is detrimental to both health education and patient safety. While the generation gap has always presented a risk, the cultural differences between digital natives and immigrants are particularly salient in health education and healthcare services today.

Sallam (2023, 17) maintains that ChatGPT, similar to other large language models, has "the potential to expedite innovation in health care and can aid in promoting equity and diversity in research by overcoming language barriers." Basaran and Duman (2024, 1499), meanwhile, draw attention to the significance of "digital literacy, language barriers and the availability of reliable Internet connectivity" with respect to ChatGPT. At the same time, Singh, Arora, and Singh (2024, 6) posit that some problems with ChatGPT emerge in the area of medical ethics, "including how data is interpreted, who is responsible and other private issues." Masood et al. (2025, 4908) note ethical and legal problems, including "privacy, data security and informed consent requirements," among others. ChatGPT is appropriate to inform both communities and individuals about public health topics, including vaccination, environmental health, and reducing the risks of chronic diseases. However, Biswas (2023, 869) contends that "the use of ChatGPT in public health should be carefully considered and implemented with caution." I side with Héder (2020, 71) in arguing that the potential and complexity of AI and the aim to regulate it lead to "technological enlightenment." In the words of Nechesov, Dorokhov, and Ruponen (2025, 13896–97):

> Developing an ethical framework that is not exclusively human-centered, but instead considers the interests of all beings capable of reassessing their primary goals and actions, whether artificial or natural, is essential to prevent conflicts between different forms of intelligence.

Even if AI unequivocally gives rise to ethical ambiguities, its advantages are overwhelming. To be sure, AI ethics and healthcare ethics go hand in hand, and healthcare workers should observe patient rights above all. In the end, it is only acceptable

to employ AI in healthcare if it infringes neither patient rights nor medical ethics. Smola et al. (2025, 13) found that the use of AI in healthcare in Polish society was often marked by a deficit in empathy and emotional intelligence. Meanwhile, in Croatia, Cartolovni, Malesevic, and Poslon (2023, 1) additionally argue that, when using AI, the existing values of the doctor–patient relationship, "such as trust and honesty, conveyed through open and sincere communication," should be upheld.

Using AI does not necessarily dehumanize digital society. In fact, digital society is instrumental in including an increasing number of citizens (e.g., patients and healthcare workers) into a community based on digital health literacy and personal qualities, including integrity, reliability, teamwork, and the capacity for transboundary cooperation. It should also be considered that regulating digital society usually follows technical development. Ultimately, it is not the law that determines digital society but digital society that gives a boost to legal development. That dynamic is salient in Regulation (EU) 2024/1689 of the European Parliament and of the Council on AI in its prohibition of the following practices that pose an unacceptable risk:

- Harmful AI-based manipulation and deception;
- Harmful AI-based exploitation of vulnerabilities;
- Social scoring;
- Individual criminal offense risk assessment or prediction;
- Untargeted scraping of the Internet or CCTV material to create or expand facial recognition databases;
- Emotion recognition in workplaces and institutions of education;
- Biometric categorization to deduce certain protected characteristics; and
- Real-time remote biometric identification for law enforcement purposes in publicly accessible spaces (European Commission 2024).

Beyond those unacceptable risks, there are cases of using AI that display high risk—for instance, "AI safety components in critical infrastructures (e.g., transport), the failure of which could put the life and health of citizens at risk" (European Commission 2024). Theoreticians need to bear in mind that said EU regulation is fresh and makes an attempt to allay social fears of AI. It is a legal device to bring AI-related laws in various EU member states into compliance, not a panacea to all possible problems exhibited by current and future AI use. In all, the European Union's AI Act exerts an extraterritorial effect because it is also legally binding for organizations in non-EU countries that process EU citizens' data. The EU AI Act will hopefully prompt other legislatures (e.g., the U.S. Congress) to adopt similar laws. It will certainly be followed by other AI regulations adapting the EU law to the progress of AI. At any rate, legal pluralism in AI law has to be avoided.

Indeed, the use of AI in healthcare, health education, and other areas is difficult to regulate, for current legal tools are not sufficient for that purpose. In a digital society, obsolete rules should give way to new kinds of norms that can cover more areas of possible AI use. Furthermore, codes of conduct on AI use should be encouraged in healthcare facilities and institutions of health education. New norms could be derived from already existing ones, including ethical norms reinforced with compensatory damages that can more effectively prevent AI users from violating those norms.

5. Digital health literacy as a precondition for digital society

Digital health literacy is arguably promoted through digitalization's educational role in healthcare. I find that educational function to be as important as the advancement of digital health infrastructure. Citizens speaking and understanding the same technical language form a community with similar legal, social, economic, and ethical norms. Clearly, social cohesion is largely based on people at much the same cultural level. While digital health literacy is a key component of society's cultural foundation, value pluralism also has to be maintained. Technical consistency does not rule out the parallel existence of various value systems within the same community. Although technological justice is a precondition for social justice, value pluralism is a prerequisite for it as well. Ultimately, technological justice and value pluralism are both necessary to foster fair and just digital societies.

A binary perception of digital health literacy results in some patients totally refusing digital healthcare, whereas digitally literate patients enjoy its advantages. To a certain extent, negative thinking about digital healthcare may be surmounted through supportive intervention by the state. Without the state's involvement, however, ostracized patients might hamper the progress of digitalization in society. As long as a large number of patients are ill-equipped to benefit from digital healthcare, they will feel that it is their natural right, if not obligation, to resist digital citizenship and the mandatory use of digital healthcare services.

The preamble to the constitution of the World Health Organization states, "The health of all peoples is fundamental to the attainment of peace and security and is dependent upon the fullest co-operation of individuals and States." The preamble also declares that "unequal development in different countries in the promotion of health and control of disease, especially communicable disease, is a common danger." States Parties to the International Covenant on Economic, Social and Cultural Rights "recognize the benefits to be derived from the encouragement and development of international contacts and co-operation in the scientific and cultural fields" [Article 15(4)]. Without a doubt, the human right to know, in a broader sense, is largely based on sharing knowledge and expertise among nations. Digital health literacy should thus likewise be extended to nations with less wealth.

Observing human rights necessarily promotes not only the rule of law but also the social functioning of a digital society. That concomitant dual effect helps spread digital health literacy. According to Article Q(3) of the Fundamental Law of Hungary, international human rights treaties and universal instruments are incorporated into the Hungarian legal system through promulgation in national laws. However, the generally recognized rules of international law form an integral part of the legal system without promulgation. Not only international human rights but also national legal norms and other sources of law and ethics are what encourage digital health literacy.

Digital health literacy is a precondition for a digital society, with several factors determining the functioning of such a society. Digital health literacy suggests a social understanding of the healthcare system. In fact, there is no digital healthcare without digital health literacy, and there is no digital society without digital healthcare.

Furthermore, the enlargement of digital healthcare and digital society is a legal imperative in all countries. Citizens should be allowed ample time to change; indeed, patients in particular often struggle with making the shift, with the factor of age being only one of the determinants of that sociodemographic phenomenon.

6. Characteristics of digital society

According to the constitution of the World Health Organization, "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity." In today's societies, it is vital to overcome diseases and infirmities, though such successes alone are not sufficient to the task. Social well-being is as essential as physical and mental health. Digital healthcare, in a manner of speaking, results from technological pragmatism. Young people today, active in the job market, are digitally socialized to be driven by results. That common trait encourages societies to become ever more digital. With the physical expansion of societies and a growing number of healthcare facilities specialized in various areas of medicine making efforts to find the best treatment method for the same patient, digitalization is becoming inevitable. It is not only the infrastructure in societies that becomes digitalized, for digitalization also permeates the mindset of citizens and the way in which societies function.

Contemporary societies are characterized by a high level of digital connectivity. In a broader sense, all societies have already become digital to some degree. It is not solely the level of digitalization that makes a society digital, however. From the perspective of economic well-being, societies with less wealth are wrongly excluded from the community representing digital society. That said, digital connectivity is constantly developing all over the world and, in the long run, will reach societies in developing countries as well. Where, as a result of social well-being, digital society comes into existence, social welfare usually surges concomitantly.

At present, digital sovereignty has undoubtedly grown in importance, and legally binding norms attempt to channel it. However, digital sovereignty had proactively existed before relevant laws were put into effect. Indeed, such sovereignty is interconnected with the phenomenon of digital society. I side with Couture, Toupin, and Baños (2024, 742) in arguing that individuals should "build their own digital sovereignty" because states cannot keep pace with tech companies and thus cannot offer complete online security for their citizens. Even though digital sovereignty should be upheld in any digital society, regulating it might not yield comprehensive protection.

Digital society is partly self-regulated and partly subject to the law. Self-regulation forms the foundation of digital society because the more freedom a society enjoys, the less regulatory rigor will erode social capital. When a society becomes a digital one, there is no more need for a large number of meticulously elaborated laws. Even so, the basic legal framework of democracy requires regulations to preserve the rule of law, among other means. Digital constitutionalism is meant to protect that basic legal framework of civil and political rights, as well as economic, social, and cultural

rights, among others. According to Suzor (2018, 4), "The key challenge of digital constitutionalism is to identify how values of good governance can be protected in the digital age." By and large, lawmaking relies on social actors, who are able to give rise to a viable, digitally sustainable society. As a consequence, regulatory minimalism is also an essential requirement in any digital society.

Digital society exists both in theory and practice. Normally, theoretical reasoning furnishes practice with social norms to follow. In many situations, citizens may elude the law but nevertheless abide by broadly accepted social norms. Practical norms underlie digital society. To bring about a digital society, citizens need to be supplied with digital skills and tools. Notwithstanding the lack of those tools, a digital society's substructures may be devised in theory and later be put into reality. As a consequence, social norms will be tailored to practical norms.

From the perspective of digital society, the decriminalization of acts against the secure use of health information systems should be taken into consideration, for criminal sanctions do not in fact deter perpetrators. White-collar criminality tied to information systems cannot be restrained by depriving people of their liberty or with other typically criminal sanctions. Protecting victims is always more effective than imprisonment, as mediation has shown. Payment to the state instead of directly to victims is also less preventive. Such white-collar criminality runs counter to morality and other people's material interests, not to bodily integrity. Indeed, even in its modern form, criminal law neither protects nor corrupts digital society. Considering all the above, I see two solutions:

1. Eliminating criminal liability from the digital world; and
2. Introducing reforms in criminal law tied to information systems, especially by devising new sanctions—for instance, divulging the perpetrator's name and identity, which could be preventive in the marketplace.

The reception or rejection of the rules that govern digital society naturally sparks debates between social groups. Debates usually generate various and equally important answers to questions arising from disparate conceptions of digital society. Nevertheless, if a mirror-image perception of digital society can be transcended, then it will largely promote the development of such a society. The opposition between parties in favor and those against may lead to a social divide that could prove to be socially detrimental. However, respect for natural law advances social actors' capacity to comply with positive law and the rules of morality at the same time. Cooperation between social actors who represent different opinions on digital society is important as well. While we witness incongruence in current understandings of today's new world based on digital society, a multitude of converging arguments are setting the course for digital development. As a result, a diversity of human thinking can be expected to expedite digitalization and social development, not obstruct them.

7. Conclusion

In digitally advanced countries, bringing digital society into existence is a basic aspiration. Patients should receive the highest attainable level of healthcare, as is their

human right. That standard is largely contingent on the digital literacy of patients and on the expectation of proxy decision-makers for valid health information from both healthcare professionals and social media influencers. Today, social media platforms disseminate health information that often originates from dubious sources. Surmounting health mis- and disinformation is thus a prerequisite for digital society. In that regard, institutional trust is a necessary condition for social trust.

AI ethics is closely tied to healthcare ethics. Indeed, neither digital society nor advanced healthcare is possible without AI. In that relationship, it should be understood that AI does not dehumanize society. On the contrary, AI helps citizens become integrated into digital society and at once preserves human rights. Regulating AI in healthcare is nevertheless complicated. Whereas old-fashioned laws are clearly inadequate, codes of conduct and other ethical norms with new kinds of sanctions could be the first step toward developing more appropriate norms. In a well-constructed digital society, regulatory minimalism supports social functioning. However, maintaining the basic values of good governance—for example, ensuring well-being—is pivotal. Regarding digital sovereignty, citizens sometimes feel abandoned by the state; as a result, digital sovereignty ought to be reinforced. Meanwhile, the role of criminal law in protecting health information systems should be reassessed, for it can either be substituted or amended by more effective legal and extralegal measures—for example, disclosing an illegal or immoral use of information systems.

In Hungary, legally speaking, not all digital patients are digital citizens, at least not yet. Digital citizenship can put Hungarian society on the road to becoming digital. If digital society is the future of humankind, then the European Union's AI Act merely marks the beginning, with the short-term goal of providing EU citizens with the comfort of legal protection. Today, however, the eradication of unacceptable AI risks is more a general objective of the law than a palpable reality.

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The AI effect today: On denials of AI's intelligence

This article analyses the AI effect—briefly, the denial of AI's intelligence—in three steps. First, it explains the tendency to deny that AI is truly intelligent. Due to experiencing its own intelligence as self-awareness, the human mind cannot help but to tie any intelligence to self-awareness. Thus, for AI to be regarded as intelligent, it would need to have self-awareness, and because it does not, humans tend to deny that AI is intelligent in any way. Second, the article presents the AI effect as an ethical issue insofar as the effect denies that AI is indeed intelligent, albeit in ways different from humans. Third, it analyses a characteristic case of the AI effect—insistence that AI is not intelligent because it has no sentience—by examining the retroactive denigration of AlphaGo.

Keywords: *AI, AI ethics, AI effect, intelligence, awareness, AlphaGo*

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1. Introduction

AI is neither artificial nor intelligent. – Crawford (2021, 8)

As evidenced by that opening quotation and representative examples analysed in the section on AlphaGo at the end, the consensus within the critical literature on AI seems to be that the new wave of AI based on deep learning (DL) is not intelligent at all and that the hype accompanying it is at least naive if not outright "corporate propaganda" (Pasquinelli 2023, 15). This article's contention, however, is that the question of AI's intelligence is far from settled and that claims that AI is really artificial unintelligence (Broussard 2018) reveal less about AI and more about, to paraphrase Karl Marx, the poverty of AI critique, as well as people's deep-seated anthropocentric prejudices that deny the very possibility of other-than-human intelligence(s).

In what follows, the article first situates current denials of AI's intelligence within the history of the so-called AI effect as a tendency to retroactively disqualify anything that AI shows itself capable of as being unintelligent. The AI effect is counterposed to the ELIZA effect, an enthusiastic attitude toward AI that instead embraces AI as in fact intelligent, and Graziano's (2013, 2019) attention schema theory to explain both as expressions of "everyday animism," polarized by the interplay between perceptual illusion (i.e., knowing that machines are not self-aware but acting as if they are) and cognitive illusion—that is, believing that machines are in fact self-aware.

Second, the article presents the AI effect as an ethical issue that prevents the actual understanding of AI as other intelligence and thus precludes the formation of any genuine ethical relation with it. Calls for explainable AI, commonly abbreviated to "XAI," are interpreted as being decidedly one-sided because they place the whole burden of explanation on AI and fail to recognize that, to understand AI, the very mode of human understanding would have to change (Fazi 2021).

Third and last, the article analyses examples of the AI effect taken from recent critical literature on AI and organised around a characteristic contemporary case of the denial of AI's intelligence: the insistence that AI is not intelligent because it has no sentience in retroactive denigrations of AlphaGo's achievements since 2016. As shown, the case also makes visible an aversion to understanding intelligence as a material, computational process.

2. The AI effect and the ELIZA effect

Despite intensifying after the initial hype surrounding the ascension of DL AI dissipated in the late 2010s, denials of AI's intelligence are not new. In her seminal study of early AI, *Machines Who Think*, Pamela McCorduck (2004, 204) noted early on that:

> It's part of the history of the field of artificial intelligence that every time somebody figured out how to make a computer do something—play good checkers, solve simple but relatively informal problems—there was a chorus of critics to say, but that's not thinking.

As McCorduck's observations makes clear, the denial of AI's intelligence always comes *ex post* and never in a sense that something does not require genuine intelligence before AI does it. What McCorduck suggests is that when it comes to AI, the usual order of proof is reversed; instead of AI's failing to meet *ex ante* criteria of what constitutes real or genuine intelligence, those criteria seem to be whatever AI cannot do (Dreyfus 1992) or, at the time, is thought of incapable of achieving. In this article, following Hainlein and Kaplan (2019, 2), the phenomenon is called "the AI effect," defined as a denial of AI's intelligence even when it exhibits intelligent behaviour.

At first glance, the AI effect seems to be the opposite of the ELIZA effect, a widely documented and discussed attitude toward early AI. The ELIZA effect takes its name from the eponymous computer program released in 1966 that could perform simple psychotherapeutic conversations with human users (Weizenbaum 1966). ELIZA was so popular and the users' experience of it so immersive that the tendency of human users to develop social and emotional attachments to computer programs and to project human traits such as subjective feelings and self-awareness onto them is still called "the ELIZA effect" (Natale 2021, 50–67). The ELIZA effect describes a situation in which the intelligence of AI not only goes unquestioned but is also inflated to the point that, at least in the imagination of its users, it involves sentience and emotions. The ELIZA effect is thus an attribution of intelligence to AI even when AI does not exhibit intelligent behaviour.

Immediately salient is an important feature that both effects have in common: positing a common sense (self-)understanding of human intelligence as a measure of any intelligence. Thus, the difference between them is that, in the case of the AI effect, AI is chastised on the grounds that it has no humanlike intelligence, whereas in the ELIZA effect, it is cherished precisely because it is perceived as having humanlike intelligence. The difference between the ELIZA and AI effects is therefore not a difference of kind but of degree; they are the extreme points of the same spectrum of everyday attitudes that use an intuitive, experiential understanding of human intelligence as the measure of any intelligence. From another angle, what is missing in both cases is any conception of intelligence that can be nonhuman.

Historically, the oscillation between both effects was not random but conditioned by the actual performance levels of AI. When its performance was weak, the AI effect was relatively rare, whereas the ELIZA effect was so prevalent that Weizenbaum (1976), the inventor of ELIZA, felt compelled to dedicate a whole book to its critique. By contrast, the current prevalence of the AI effect can be attributed to the explosive rise in AI's levels of performance, whereas rare examples of the ELIZA effect—such as Google engineer Blake Lemoine's claim that the language model LaMDA is sentient—are met with unanimous scorn and derision (Bratton and Agüera y Arcas 2022). Thus, there seems to be an inverse correlation between the actual intelligence of AI and its social and cultural recognition.

Explaining both the ELIZA and AI effects requires returning to what they have in common: an intuitive understanding of intelligence as inseparable from self-awareness. According to Graziano (2013, 69), human (self-)awareness is a computed model of attention. That model is essentially pragmatic and focused on being efficient in

predicting one's behaviour and the behaviour of others—in short, its function is primarily social. For that reason, and given the demands of computational economy, it is also not exhaustive. Awareness is not a complete account of material computational processes that generate human intelligence but instead a simplified, reductive model that abstracts from anything too complex and material and feels like an immaterial presence within our heads (Graziano 2019, 70). Since human intelligence is inseparable from the experience of subjective awareness, it is intuitively inconceivable that intelligence could exist without it.

Early AI such as ELIZA affected its users in ways similar to puppet shows. A basic condition that allows people to become immersed in puppet shows and to enjoy them is a human tendency to project awareness everywhere (Graziano 2019, 6–10). People enjoy puppetry precisely because they suspend their disbelief that puppets are neither alive nor self-aware. It is a form of controlled illusion; audiences assign awareness to the puppets on the level of perception but on the cognitive level know that puppets' awareness is not real (Graziano 2013, 205–6). However, the attitude toward AI shifts once it is no longer limited to preprogrammed schemes and begins to exhibit signs of actual intelligence instead.

This article's working definition of *intelligence* as an ability to make autonomous decisions, based on sensing the environment, that are efficient (i.e., not random) in relation to it comes from recent theories in neuroscience (Damasio, 2021; Ledoux 2019, 47–77) and from Land's (2019) understanding of intelligence as cognitive autonomy in his essay on AlphaGo Zero. The crucial term is (cognitive) autonomy, not (self-)awareness, which allows positing AI as being truly intelligent regardless of whether it is self-aware. Early symbolic AI was unintelligent because it consisted of program execution and worked by applying preset rules. In the case of DL AI, by contrast, all the above conditions for actual intelligence are met. The environment is the data that AI is exposed to and trained with; sensing is the relation(s) that it forms with said data; and intelligent behaviour is autonomous decision-making that it performs in response to data—for example, the way that it parses and clusters data as well as extracts features from and analyses patterns in said data. DL AI not only surpasses traditional programming but was developed precisely for situations in which programming proved to be impossible (Mendon-Plasek 2021, 44) and for problems that it could not solve (Burrell 2016, 6), especially in cases that required actual (machine) intelligence and for which rote computation was insufficient.

It is precisely the encounter with real machine intelligence—that is, what distinguishes today's AI from early AI and puppets—that triggers a specific reaction whose function is to prevent the transition from perceptual illusion toward cognitive illusion: an actual belief that AI possesses humanlike self-awareness. The reaction manifests as a dismissive attitude characteristic of the AI effect, instead of an enthusiastic, playful one characteristic of the ELIZA effect.

The lack of real intelligence in early ELIZA-like AI, which consisted of relatively simple algorithms based on a few crude preprogrammed responses to user input, enabled the ELIZA effect. Immersive user experience with simple, not truly intelligent chatbots assumed a form of pattern completion by tapping into and stimulating users' imagination insofar as the imagined psychic depth and real understanding on

the side of the chatbots was entirely the user's construction (Natale 2021, 107–25), much in the same way that people pattern-complete the actions of puppets on stage or animated characters on a TV screen. Viewers are shown only a hint—anthropomorphous bodies moving and human voices talking—and their imaginations fill in the rest.

In a reverse situation, the actual intelligence of the current DL AI disables users' immersion because it presents a risk that perceptual illusion will become a cognitive one. Users attempt to convince themselves that AI is not truly intelligent, for if it were, then the risk of cognitive illusion would not exist. Due to experiencing its own intelligence as self-awareness, the human mind cannot help but to automatically tie intelligence to self-awareness. However, self-awareness is the way that human intelligence works and is not binding for any other forms of intelligence. Current DL AI is a striking example of an actual intelligence that works without any recourse to self-awareness or subjective experience (Browning and LeCun 2022).

For human users, the situation is a precarious one. People cannot help but assign awareness to machines that they interact with (i.e., everyday animism), because assigning awareness is a foundational feature of human sociality: people interact with other people only if they assume that human others have minds and self-awareness as they do. However, human sociality does not stop at other humans, for people routinely assign awareness to toys, animals, characters in books and movies, and even machines as well. That tendency works flawlessly if humans are certain that the illusion that machines are self-aware is only a game, a playful as-if immersion, which is possible as long as machines are not really intelligent. However, once machines begin exhibiting actual intelligence, the routine assignment of awareness runs into trouble and breaks down.

When interacting with truly intelligent machines, it becomes far more challenging to keep the illusion of their awareness under control. The routine assignment of awareness works flawlessly in the case of unintelligent computer programs; users assign awareness to them but are at once certain that because they are not intelligent that they cannot possibly be aware. The illusion of machine awareness thus remains at the level of perceptual illusion. The reverse is the case when users confront AI that exhibits real intelligence. If they grant it intelligence, they risk triggering an automatic correspondence between intelligence and self-awareness and consequently a transition from merely a perceptual into a full cognitive illusion of machine awareness. At the same time, however, users can be quite certain that AI has no real self-awareness; thus, users confront cognitive dissonance. In that case, because AI is intelligent, it has to be self-aware, but it obviously cannot be self-aware. The solution is to deny that AI is intelligent at all, which is precisely the mechanism of the AI effect, as explored later in the section on AlphaGo.

3. The AI effect as an ethical issue

The question of AI's intelligence, because it involves human relations with others and ourselves, is not only an epistemological question but also, though not usually

presented as such, an ethical question in a Foucauldian sense—that is, not an application of transcendent morality but an immanent examination of how people relate to themselves and others (Foucault 1997/1994). This article attempts to show that any kind of genuine ethical relation to AI can be established only once humans resolve the tendency to posit their common sense understanding of human intelligence—how we think that we think—as a measure of any intelligence whatsoever (Bratton 2015, 74) and any deviation from it as a sign of inadequacy and a lack of intelligence on the side of AI. One of the problems of the AI effect is precisely that it uses human intelligence as a measure of any intelligence, which makes it not only an epistemological but an ethical issue as well.

The examination of human intelligence's often bigoted relationship to other, especially machine, intelligences constitutes this article's contribution to current discussions on AI ethics. Those discussion chiefly focus on the machine side of that relationship in the sense that they investigate how machines could be made to act in more ethical ways (Pasquale 2020) as well as how they can become more transparent to human understanding and accountable to human judgment (Diakopoulos 2020). In both cases, instead of implying a truly ethical relationship, the word *ethics* seems to be an euphemism for "machine submission" and "human control": that an often erratic, unpredictable machine behaviour has to be brought under strict human supervision and its opaque inner workings made readable by humans.

Because the explicability of increasingly complex DL AI is currently one of the most-discussed issues in conversations about AI ethics, this critique may represent a contribution to the very conditions of making AI understandable by highlighting certain weaknesses and blind spots in common sense assumptions about what would understanding AI would mean. In particular, humans tend to judge AI by the standards of human intelligence. As a consequence, they fail to account for differences between how human and artificial intelligences work. If people instead suspended their anthropocentrism, then a better understanding of AI would be possible but also reveal that the fault for AI's current opacity lies not entirely with AI—with its characteristic black box quality (Pasquale 2015)—but also with humans' flawed attempts to understand it thus far. In other words, significantly more effort would be required to cultivate a greater human understanding of AI because understanding AI is made difficult not only by its complexity but also by the lack of human readiness to understand it.

Although providing a complete theoretical framework for understanding AI is beyond this article's scope, it nevertheless attempts to provide at least one necessary starting point: a relaxation of the assumption that people with their current understanding can understand AI. It also requires a disclosure of certain problematic habits of thought that are ingrained in human attitudes toward AI and function as epistemological obstacles (Bachelard 2002/1938, 24–32) to understanding AI. Admitting that AI is indeed intelligent, just in a different way, might allow for a different, less judgmental, and thus more understanding approach to AI ethics (Kaluža 2023).

What makes the AI effect problematic from an ethical perspective is the tendency to extend the question of whether AI is self-aware to a negation of its intelligence. Although it is obvious that AI has no self-awareness, the question of whether it

exhibits actual intelligence is an altogether different, less unequivocal one (Agüera y Arcas 2022; Browning 2020). Off-hand claims that the intelligence of AI is not real intelligence are not just *non sequiturs*—that is, if something is not self-aware, then it does not logically follow that it is also not intelligent—but also contain unwarranted dismissiveness toward AI beyond what is necessary to establish that it is not self-aware. To show that AI is not self-aware does not require resorting to dismissiveness, and said dismissiveness therefore reveals something that says as much, if not more, about the faults in the human understanding of any intelligence, including our own, than it does about AI.

The anthropocentric (mis)understanding of (artificial) intelligence does not come first but is instead a derived resolution of the cognitive dissonance mentioned above, such that AI is disqualified from intelligence proper as collateral damage of the human need to keep the illusion of machine awareness under control. Positing human intelligence as being the only real form of intelligence comes afterward, because machines cannot be intelligent, for real intelligence can only be human intelligence. In that way, the intuitive perception of human intelligence is established as a measure of any intelligence not as a consequence of some prejudice against machine intelligence but as a pragmatic solution of a problem posed by the risk of a perceptual illusion developing into a cognitive one. As a consequence, the very possibility of any real machine intelligence is excluded a *priori*, which leads to the development of the AI effect—to wit, that anything AI does is not intelligence and intelligence is whatever AI cannot do. Because the standard of intelligence is posited in exclusively anthropocentric terms, the only way to evaluate AI is to measure it against an intuitive perception of human intelligence, namely by perceiving it as a lesser, ever-inadequate version of human intelligence that can never really live up to the original. Although "it would be wiser to separate 'intelligence' from 'consciousness' and 'sentience'" (Agüera y Arcas and Norvig 2023), such lenience toward machine intelligence is challenging to achieve due to the pervasiveness of the AI effect.

In contrast to other work on AI explainability (Larsson and Heintz 2020), this article contends not that AI is an opaque black box (only) due to its complexity but (also) due to the unwillingness and inability to understand it on the human side owing to the AI effect. AI is understood as the inadequate mimicking of human intelligence due to the pervasive human inability and refusal to even acknowledge the possibility of the existence of autonomous machine intelligence, much less to understand it as such. For example, AI critic Harry Collins (2018) has called artificial intelligence "artifictional intelligence," meaning an apparent, counterfeit intelligence because it is not the same as human intelligence (16–18). Another example from another prominent AI critic is that "neither deductive algorithms nor statistical techniques excel in mimicking human intelligence" (Pasquinelli 2023, 232). In such claims, the unquestioned assumption is that AI mimics human intelligence, and it is dismissed as falling short of it. Along the horizon of intelligibility constituted by the AI effect, any difference between human and machine intelligence is immediately recast as a lack or insufficiency with respect to the human norm. "Outing" AI (Bratton 2015) would thus mean perceiving it as an actual but different intelligence instead of it being perceived as a lesser version of human intelligence.

The ethical question is not whether humans can understand AI with their current thinking but instead how humans relate to AI and whether that relationship involves acknowledging AI's autonomous intelligence that might not exist (exclusively) for our understanding and functional use. In other words, although discussions on XAI have focused almost exclusively on the AI side, ethical issues exist on the human side as well. Consequently, human relationships with AI cannot be ethical as long as the AI effect is at play. Instead of making AI more understandable, the ethical task ahead may be making humans more understanding of AI not in the sense of completely comprehending AI, which may be impossible anyway, but its acceptance as another form of intelligence that may remain at least partly secretive (Amoore 2020, 133–53).

XAI has little to do with ethics but a lot to do with power, namely attempts to curb AI and make it subservient or "aligned": "The current wave of Artificial Intelligence Ethics Guidelines can be understood as desperate attempts to achieve social control over a technology that appears to be as autonomous as no other" (Héder 2021, 120). In that sense, XAI is not so much about genuine understanding as it is about surveillance (Héder 2020). At the same time, cultivating an ethical relationship with AI would also involve adopting a more understanding attitude toward it, even if it means dispensing with the obsessive urge to scrutinise and control everything about it. Thus, "Disobedient AI is not necessarily a threat" but rather "an opportunity to shape new human–technology relations that are not based on domination" (Hosseinpour 2020, 50).

Such an attitude would not substantially differ from how we ethically relate to other humans, because other humans are, in a way, black boxes as well. As in AI's case, humans lack access to the actual processes of intelligence in other humans and can only discern their surface traces. Even so, that does not preclude people from (sometimes) forming meaningful ethical relations with them. The only difference is that humans think that they have access to the inner workings of their own intelligence when they in fact do not. The explanation that people demand from AI is doubly anthropocentric: that AI makes itself explainable not only in human terms but in terms of a deceptive intuitive (mis)understanding of their own intelligence. The first step in making humans more AI understanding would subsequently mean humans' reengagement with their own intelligence.

4. AI Effect after AlphaGo's 2016 victory

The turn toward human intelligence and its common sense (mis)understandings is not a detour but a necessary step to explain the AI effect as a denial of AI's intelligence because the AI effect has the same structure as a denial of human intelligence. Of course, the AI effect does not mean that humans tend to deny that they are intelligent in the same way that they routinely deny that AI is. On the contrary, humans tend to deny that AI is intelligent while not only affirming that humans are but also positing human intelligence as a norm for AI to attain. However, what is the same in both the affirmation of human intelligence and the denial of AI's intelligence is a common sense misperception of how intelligence works.

Because humans are not and cannot be aware of the material, computational processes of human intelligence, their experiential conception of it involves reducing it to self-awareness as something immaterial in the human brain. Such a reductive experience of human intelligence as immaterial awareness prompts an aversion to any conception of intelligence as an (exclusively) material, computational process without awareness. That aversion, in turn, is involved in the AI affect—a conviction that non-aware intelligence is not real intelligence—and in dismissive attitudes toward AI that prevent the formation of any meaningful ethical relations with it.

An exemplary case of the contemporary AI effect was the denigration of AI that played the game go in 2016. Immediately before the landmark 2016 AlphaGo victory against Lee Sedol, computer scientists thought that such an achievement was at least a decade away due to the difficulties posed by the immense complexity of playing go that cannot be resolved via brute force computation (Levinovitz 2014). In other words, for AI to play go, it would need something akin to artistic intuition, which was precisely the reason why an AI victory against expert human go players before 2016 was conceived to be not only difficult but impossible (Du Sautoy 2019, 18–22, 25, 30–43). Before 2016, the AI effect was thus expressed as follows: Because playing go requires creative intuition, it is by definition impossible for machines to win given that they may be capable of lowly computation but never of higher intelligence functions such as creative intuition, as if intelligence is whatever machines cannot do. However, after the 2016 AI go triumph, the AI effect remained in place, only that instead of continuing to be the epitome of human creative intuition, the game go itself was instead demoted to mere math, which can be solved by computational processes done by machines. Again, the thinking was that whatever AI does is not intelligence.

For example, in his 2023 piece "The Stupidity of AI" in *The Guardia*n, influential AI critic Bridle (2023) grouped playing go together with playing chess as an example of a "narrow domain of puzzles" that he contrasted with "imagination and creativity." Thus, playing go after 2016 was no longer a puzzle of imagination and creativity but a simple puzzle not necessarily requiring imagination or creativity. In another example, Gray and Suri (2019) highlighted AlphaGo as an example of how "AI is simply not as smart as people hope or fear" (30). To preclude readers from being overly impressed by the victories of AlphaGo and later AlphaGo Zero, the authors remind readers that "the rules of go are fixed and fully formalized and it is played in a closed environment" (31). Those claims completely bypass the crucial point of the immense complexity of playing go due to the sheer number of possible moves within such a closed environment. As any game, go is based on rules, though their execution, due to the game's complexity, is far from straightforward and involves a great deal of imagination and creativity from humans, which is precisely why go used to be regarded as a game that requires more or higher intelligence than the simple execution of rules and why it required deep learning AI to finally master it. Similarly to Bridle and consistent with the AI effect, Gray and Suri (cherry-)picked a dimension of go that makes it similar to any other game while quietly sidelining the dimensions that set it apart and make it require special intelligence. They thus conclude their brief dismissal of go and AI playing go as follows: "Life is more complicated than a game

of go" (32). Although no doubt true, it hardly proves that winning go is not a display of real intelligence. Because AI's victories in go are undeniable, the somewhat predictable human move in response has been to deny the intelligence required to play go and, by extension, AI's intelligence.

Another influential AI critic, Crawford (2021), has countered the claims that AlphaGo exhibits "some kind of otherworldly intelligence" with an alternative explanation:

> AI game engines are designed to play millions of games, run statistical analyses to optimize for winning outcomes, and then play millions more. These programs produce surprising moves uncommon in human games for a straightforward reason: they can play and analyze far more games at a far greater speed than any human can. This is not magic; it is statistical analysis at scale (205).

Albeit factual—AlphaGo did indeed play millions of games and ran statistical analyses—the reiteration of the "it's just statistics" theme still fails to explain why running millions of games and running statistical analyses does not constitute intelligence. The idea that mere statistics cannot ever constitute real intelligence is only self-evident if it is assumed that intelligence cannot be a material computational process as a matter of principle. Crawford reduces AI's intelligence to a technical operation and suggests that if something is technical, then it cannot be truly intelligent. That claim is as unusual as it would be to maintain that because Lee Sedol's brain fired billions of neurons in complex patterns during a game of go, it is just neurochemical activity and thus not real intelligence. The fact that something involves a material computational process is not in itself proof that it is not intelligent. In short, go went from being *the* game, one requiring high-level intelligence before 2016, to being just *a* game and, as such, irrelevant for intelligence after 2016.

In perhaps the clearest example of an aversion to intelligence as a computational process—AI is inferior because it consists of "mere computation" without sentience—yet another influential AI critic Broussard (2018, 36) has argued that "AlphaGo is not an intelligent machine, however. It has no consciousness." That claim implies, however, that real intelligence requires humanlike consciousness. Broussard adds quite emphatically that computers are not and cannot be intelligent because they only execute orders and have no sentience or soul (11–12) and thus completely disregards the two key questions of current AI: whether DL is really a mere execution of orders and whether there can be an intelligence without awareness. Broussard's disavowal of those questions is a *non sequitur;* if something is not sentient, then it does not (necessarily) follow that it is merely executing orders. Although logically false, such an assertion still makes perfect sense in the context of the AI effect; if something merely executes orders, then it is not intelligent, and if it has no awareness, then it must be unintelligent (i.e., the inviolable axiom of the AI effect). Thus, AI is reduced to merely executing orders.

The case study presented here perfectly illustrates the way in which the AI effect works. It corresponds to the logic of moving goalposts, as already observed by

McCorduck (2004). In short, intelligence becomes whatever machines cannot do, and likewise, whatever machines can do does not constitute intelligence.

5. Conclusion

Many theories view AI as real intelligence that is merely different from human intelligence (Agüera y Arcas and Norvig 2023; Bratton and Agüera y Arcas 2023; Ernst 2021; Fazi 2021). Denials of AI's intelligence have also been critically investigated as a way of coping with a Copernican trauma that involves the decentering of the image of human intelligence as the norm and endgame on intelligence, triggered by the development of AI (Bratton 2024). This article's contribution to the discussion is an attempt to connect denials of AI's intelligence to certain deeply ingrained common sense assumptions that link intelligence to humanlike self-awareness. Moreover, it presents such denials as an ethical issue, with the only precursor known to be Amoore (2020), and provides a concrete case study of the AI effect in the case of AlphaGo after 2016. Considering all the above, it seems that denials of AI's intelligence, ubiquitous in current critical literature on AI, are not so much expressions of a refined intellectual reflection but rather of common sense epistemological obstacles.

Despite being a default mode of how humans relate to AI, the AI effect is not insurmountable. It is a spontaneous common sense reaction that can be rectified upon reflection in ways similar to negations of animal intelligence (Keim 2024), non-White intelligence (Allan 2002), and female intelligence (George 1915) in the past. At the same time, because it is a common sense epistemological obstacle deeply ingrained in everyday thinking, overcoming the AI effect will probably never be a *fait accompli* but a continuous process that is made ever more urgent as the pace of AI's development accelerates. Overcoming the AI effect is perhaps *the* ethical question regarding AI.

Along with allowing a genuine ethical relationship with AI as an actual, although different form of intelligence, to develop, overcoming the AI effect would also present an opportunity to learn more about ourselves. Such learning would need to involve accepting that what we imagine as our intelligence that supposedly makes us superior to any other forms of intelligence is in reality merely a self-misunderstanding—an insight that could provide an antidote to currently prevailing anthropocentric conceits in relation to AI.

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Mitigating harmful content on social media via platform regulation: The Digital Services Act and content assessment

The Digital Services Act (DSA) implements a legal framework for digital services, including social media platforms, to ensure that they operate in responsible, accountable ways. With an objective involving three critical theoretical pillars—transparency, accountability, and responsibility—the DSA, among other functions, (mostly) holds online platforms liable for content that they publish and also imposes requirements that they mitigate and remove harmful content. However, from a critical standpoint, the DSA begs some pivotal questions. For one, how can such a legal document, even if binding, mitigate the severe societal, psychological, emotional, and even physical dangers and detriments experienced by victims of social media abuse? For another, how can a supranational regulation combat local disinformation campaigns and political propaganda? In this article, we encourage not only introducing, analyzing, and critically examining the DSA but also propose policy recommendations to ameliorate content moderation on social media platforms.

Keywords: *Digital Services Act, platform regulation, social media regulation, digital services, content moderation*

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1. Road to the Digital Services Act (DSA)

Social networking sites have become the dominant communication tools of the 21st century. As they continue to rapidly evolve, both technologically and in the number and types of users, it remains challenging to predict the direction that they will take. Legislation for such sites and social media platforms in general, as with all aspects of life, lags behind and rarely anticipates changes. Meanwhile, technology expands freedoms, and the law tries to catch up. Such trends are especially apparent regarding the regulation of networking sites, which billions of people now use on a daily basis. Indeed, those sites are the new city centers of the world and give each user their own set of soapboxes (Casey 2021, 33). The result has been problems that are difficult to address with legal regulation and now require an entirely new regulatory approach.

Legislating online harms on social networking sites and social media platforms is essential for a healthy democracy. The vast reach and influence of such sites and platforms have made them primary sources of information and interaction for billions of users. However, without proper regulation, they can quickly become conduits for the spread of harmful content, including disinformation, hate speech, and incitements to violence, all of which can have real-world repercussions. At the same time, they primarily operate based on self-regulation, which can lead to inconsistencies in content moderation, leave victims of virtual harms without effective redress, and generally allow the platforms to influence the course of public discourse as they see fit. At any time, a platform can decide that a particular type of opinion or an unpopular political group is somehow disadvantageous and consequently ban or filter them out, whether openly or without notice (Tutt 2014). That possibility creates an entirely new situation for the democratic public, because no guarantee exists that a private company with absolute control over a platform that hosts large volumes of public discourse will not significantly distort the public debate for its own interests (Harawa 2014, 396). That risk is particularly important because social networking sites provide some of the most convenient and arguably most effective ways to participate in social discourse. Regular users of social networking sites are also arguably far more politically active than others, meaning that any influence exerted on the platforms can have more direct political consequences than on other media platforms (Pew Research Center 2011).

There is a critical social need to not only preserve the freedom of social media platforms by permitting as little state influence as possible but also to regulate them in a reassuringly broad way and to curb their power to unduly influence the democratic public. Striking an appropriate balance between those two competing interests is complicated, however. If the internet is indeed an unregulated, free virtual world, then any attempt to regulate it entails the loss of certain freedoms. Regulating internet infrastructure can constitute a restriction on freedom of expression, even when not targeted at specific content or at what can and cannot be said. At present, it seems that not only legislators but also the platforms themselves are gesturing toward accepting regulation, even if their motivation remains unclear. Aside from any possible antidemocratic motives to restrict citizens' freedom of expression online,

which are necessarily incompatible with the ideals of free speech, most serious regulatory initiatives have sought to make the internet a safer, more enjoyable place for minors and adults alike. Despite the assumption that social media platforms think no differently, the primary motivation for regulatory intervention is perhaps more economical, for it is far more cost-effective to comply with a general set of rules than to comply with different laws in each country.

The current operation of online platforms is not free from specific legal regulation by the state but subject to several different rules. Platforms are partly covered by media regulations, electronic commerce law, contract and consumer protection law, data protections, and competition law, among others. However, the question of how to regulate social networking sites often raises the dilemma of whether local regulation at the national level or regional regulation at the level of the European Union (EU) is more appropriate. The law recognizes both forms of regulation because there is both national and transnational legislation regarding online platforms (Pillalamarri and Stanley 2021). However, one of the most significant legal challenges in the world of social media is precisely that the most popular platforms operate globally. Although most of those sites started and remain based in the United States (e.g., Facebook, YouTube, and X, formerly Twitter), the very nature of the internet means that they are available all over the world.

For that reason, social media platforms have to comply with an array of different, often conflicting, legal provisions in their operations. In recent years, the EU has recognized the dangers posed by online platforms and begun to employ various tools in response, including self-regulatory codes (e.g., the 2022 Code of Practice on Disinformation), directives (e.g., EU Directive 2017/541 on combating terrorism), and regulations (e.g., EU Regulation 2019/1150). However, the most significant piece of legislation—the real game-changer—has been the Digital Services Act (DSA; Gosztonyi 2025).

2. The Digital Services Act (DSA)

In view of content moderation-related polemics, especially in the context of digital safety, the European Commission issued a proposal in late 2020 titled "Shaping Europe's Digital Future." Among other things, it envisioned a comprehensive regulatory package on platform governance consisting of two major regulations: the Digital Markets Act and the DSA (Cauffman and Goanta 2021). Between them, the DSA amassed unprecedented attention from legal practitioners, stakeholders, and legal scholars owing to its innovative, holistic regulation of popular intermediary platforms such as Facebook, X (formerly Twitter), and TikTok. The core of the European regulation rests in a rather logical understanding of platform use—that very large online platforms (VLOPs), which have more than 45 million monthly active users in the EU (DSA, Article 33), wield extensive influence over public discourse and content dissemination and are therefore inherently and instrumentally accountable for and should be liable to impose effective mechanisms to provide safeguards against illegal and harmful content that may potentially reach millions of users (Papp 2022).

The principles to ensure that the platforms are indeed obliged to act against social media abuse stand on three critical pillars: transparency, accountability, and responsibility (Decarolis and Li 2023). However, even though the DSA represents a significant stride toward enhancing the digital landscape's safety and reliability, critical questions loom large. For one, how effectively can a legal document, albeit binding, mitigate the severe societal, psychological, emotional, or even physical dangers and detriments faced by victims of social media abuse? For another, can a supranational regulation effectively combat the localized scourges of disinformation campaigns and political propaganda? In this article, we examine the key obligations of the DSA and their effectiveness in the context of harms on social media.

2.1. DSA and the moderation of illegal content: A brief overview

As mentioned in the official communiqué of the European Commission (2023), a core value of the DSA is creating a safer online world by protecting users from illegal content, assessing cyberbullying and other forms of online harassment, and implementing a more transparent content moderation framework for platforms. The DSA defines *illegal content* as "any information that, in itself or in relation to an activity, including the sale of products or the provision of services, is not in compliance with Union law or the law of any Member State which is in compliance with Union law, irrespective of the precise subject matter or nature of that law" (DSA, Article 3h). Such a broad definition of *illegal content* is welcome in principle, for it can help to ensure that the legislation covers the most comprehensive possible range of harmful content online. Nevertheless, it can also lead to uncertainty in its application.

To ensure the above while not imposing an unnecessary burden to conform, the DSA does not stray far from European legislation already in effect, namely the E-Commerce Directive, but instead enforces it and aims to make its stipulations more user-centered. The Directive, enacted in 2000, proposes the renowned "notice-and-takedown" mechanism (DSA, Article 14), which permits intermediaries to enjoy immunity for illegal content on their platforms, whether it entails illegal substances, violence, or nudity, as long as they lack knowledge of such content or, upon receiving notice or otherwise becoming aware of it, remove it from their pages (Urban, Karaganis and Schofield 2016). At the same time, the notice-and-takedown provision also has the power to free platforms from conducting general monitoring and/or fact-finding, which practically waives their obligation to seek out illegal content on their pages.

Added to that, Article 16 of the DSA strengthens the notice-and-takedown mechanism, albeit with a slight twist. The mechanism proposed by the new regulation sets forth that service providers acting as hosts, including online platforms, are to implement additional mechanisms to allow users to report seemingly illegal content on their platforms or content that may violate the platform's terms of use. The latter option derives from the profoundly controversial liaison between users and platforms; although the equality of arms in the relationship is practically nonexistent due to the extreme financial power of platforms, users are essentially in a

contractual relationship with platforms once they accept their terms of use (Ortolani 2023a). Thus, given the principle of *pacta sunt servanda*, users are to submit to every provision implemented by the platform or else be restricted from using the platform's services (Quintais, Appelman and Ó Fathaigh 2023). Subsequently, to enforce transparency and adequate responsibility, platforms are required to provide a statement of reason if they decide to impose restrictions on the content or any user who has published such content after having received a notice (DSA, Article 17). *Restriction* thus serves as an umbrella term in the DSA, with applications that include making content less visible or accessible on the platform, removing user accounts and restricting services, and even demonetizing in some instances (Leersen 2023). To accentuate the principle of accountability in connection to transparency, statements of reason are required to state the deciding facts of the restriction, whether automated tools were used to determine the content's unlawfulness, whether the content violates the law or terms of use, and the information that users are given for redress concerning the restriction imposed upon them (Leersen 2023). Last, internal provisions for handling complaints are to be presented. The chief aim of those mechanisms is to allow platforms to review initial decisions and thereby provide an in-house solution for complaints lodged by sanctioned users. In practice, as Pietro Ortolani (2023a) has highlighted, internal complaint handling aims to conceptualize moderation systems to synthesize the difficulties of the task of (mostly human) content moderation and users' rights.

A final aspect that merits mention is the DSA's rigid differentiation of platforms by size and size of userbase. VLOPs, including Google or Facebook, bear more obligations than platforms with fewer than 45 million monthly active users. A crucial part of that discriminative (Husovec 2024) regulatory philosophy is risk management. The DSA proposes that VLOPs shall play an active role in assessing and mitigating *systemic risk*, a term vaguely defined by the DSA in four categories: dissemination of illegal content, adverse effects on fundamental rights, negative effects on democratic processes (e.g., elections) and public safety, and negative effects on a person's well-being or health (DSA, Recitals 80–83). To put the provisions into practice, systemic risks may exemplified as fake news propaganda during election campaigns, disinformation regarding COVID-19 or other public health emergencies, or the possibility to sell or buy illegal substances on the platform. VLOPs are therefore obliged to act when systemic risks are identified. They are to assess said risks—that is, identify and analyze possible risks emerging from the design or algorithmic activities of the platforms—and mitigate them by, for instance, taking effective, timely actions to prevent further risks from arising (DSA, Articles 34 and 35).

2.2. A critical approach: The major problems with the DSA's provisions regarding content moderation

As for statements of reason, the rationale behind the narrowness of the scope of reasoning to be provided remains unclear. As Ortolani (2023b) has highlighted, the DSA does not require reasons from platforms when they forgo taking moderation

measures—for example, leave user-generated content up or decide to not restrict an allegedly hateful account (cf. Lendvai 2024).

As for the notice-and-action mechanism, the chief practical problem may arise from the contradictory interpretation of the provision. What indeed should platforms do if user-posted content is not clearly unlawful but the terms of use strictly forbid it from being posted? For example, should Facebook remove graphic but educational videos of medical procedures? Or is selling "haunted items" with superpowers legal on Facebook Marketplace when the descriptions of the items are deceptive? It is also dubious how effective any network address translation (i.e., NAT) will be on different platforms. Though Meta (Clegg, 2023) introduced a number of new features to be in conformity with the DSA, X, for example, is actively seeking to disregard all European initiatives regarding the fight against fake news or platform governance (Miller 2023). In those ways, Article 16 introduced more questions than answers regarding practicality for both users and content moderators.

As for internal systems for handling complaints, Aleksandra Kuczerawy (2023) has speculated about how the nondiscriminatory and nonarbitrary nature of internal complaint handling should be interpreted. Such vague terms cause ambiguity for moderators and addressees and may lead to platforms handling different scenarios differently. For instance, should a high-profile account be "whitelisted," so to speak? From a practical viewpoint, the vague use of expressions in the DSA also breeds a different type of polemic. After all, what would happen, as Kuczerawy has imagined, if users were to appeal decisions en masse?

The DSA also fails to identify and mitigate specified forms of illegal content. As Asha Allen (2022) has highlighted, online gender-based violence (e.g., cyberstalking) and nonconsensual forms of content sharing (e.g., revenge porn), as described by the Proposal for a Directive for Combating Violence Against Women and Domestic Violence—both of which are highly prevalent but critically overlooked problems in the online sphere (European Institute for Gender Equality 2024)—are not considered to be systemic risks by the European regulation. As a consequence, VLOPs are not required to implement specific measures to assess such polemics (Allen 2022). It is also unclear how platforms would be able to evaluate gender-based violence when identified as a systemic risk, for most platforms have no straightforward tools other than restricting accounts or removing content. On top of that, moderators are not provided with adequate education on gender-based violence. Despite non-binding commitments, that issue in the context of systemic risks and content moderation remains to be resolved.

Last, risk assessment and mitigation are also problematic for several reasons. The DSA proposes an *ex ante* position for content moderation regarding systemic risks; risks are unavoidable and unpreventable on popular platforms, and the *prima habet* approach is therefore to mitigate preexisting risks. However, that regulatory philosophy may spawn two different but equally detrimental practices. The first is overzealous content moderation by platforms, including the constant, active monitoring of content and identifying and addressing polemic content as systemic risks so that they will not have to engage in mitigation procedures. That option effectively permits digital authoritarianism and may likely cause a chilling effect among users.

The second practice is the polar opposite of overregulation: platforms may choose to not identify systemic risks under the flag of understanding freedom of expression in a more liberal sense. As a consequence, disinformation about pandemics (cf. Kouzy et al. 2020) or political propaganda from foreign states may be able to bypass the provisions of the DSA (Lendvai 2023a). From a practical standpoint, the practice of the platforms will be instrumental. After all, the DSA provides little to no guidance on whether the marginalization of certain groups online or algorithmic bias resulting in harmful societal effects can be understood as systemic risks.

3. Alternative ways to reduce harmful content

The fight to secure freedom of expression has undoubtedly reached an exciting new stage in recent years, as the internet enables billions of people to express themselves freely. States have sought to retake control since the mid-2010s by regulating the disclosure of illegal content (Gosztonyi 2023, 182). Nevertheless, they have usually confronted a situation in which regulation can be interpreted only "at different and sometimes overlapping levels: from the local to the supra-national and global" (Raboy and Padovani 2010). Thus, "the vertical, centralized and State-based modes of traditional regulation have been complemented by collaborative, horizontal arrangements, leading to 'a complex ecology of interdependent structures with a vast array of formal and informal mechanisms working across a multiplicity of sites'" (Hintz 2015, 111). As Jack Balkin (2018, 1153) has put it, specifically regarding new methods of content regulation, "In addition to targeting speakers directly, States now target the owners of private infrastructure, hoping to coerce or co-opt them into regulating speech on the nation State's behalf." In another alarming sign, Adrian Shahbaz and Allie Funk (2021, 2) of Freedom House wrote as early as 2021 that "global norms have shifted dramatically toward greater government intervention in the digital sphere."

3.1. Years of cooperation in the EU in the 2010s

An essential step in the fight against harmful content in the EU was adopting and signing two codes of conduct. In that regard, Petra Láncos, Napoleon Xanthoulis, and Luis Jiménez (2023) have claimed that using soft law is a strategic means to provide a frame of reference for member states without taking a step toward harmonization in a field subject to interventionist measures. The first was the EU Code of Conduct on countering illegal hate speech online, whereby Facebook, Microsoft, Twitter, and YouTube—TikTok joined in 2020 and LinkedIn in 2021—committed to, among other things, reviewing valid reports of unlawful hate speech within 24 hours and removing or making such content inaccessible. The Code found the mentioned notice-and-takedown system to be an appropriate solution to remove such content. Not long after, in 2018, Facebook, Google, Twitter, and Mozilla signed the EU Code of Practice on Disinformation; Microsoft signed in 2019 and TikTok in 2020.

The adoption of those codes was preceded by a European Commission Communication on online misinformation that characterized platform providers' responsibility as a question to be carefully examined. However, such codes, which are only applicable to signatories, cannot be considered a real regulatory solution from a legal standpoint, for they have to "apply within the framework of existing laws of the EU and its member states and must not be construed in any way as replacing, superseding or interpreting the existing and future legal framework." The weakness may have been visible when Twitter, under its new owner, Elon Musk, quickly left the voluntary Code of Practice against disinformation in May 2023 (Krukowska 2023). Although a considerable advantage is that because the companies had to modify their terms of service to comply with their voluntary commitments, they essentially agreed to apply European rules to all their global users.

3.2. An alternative solution

Aside from the mentioned cooperation effort, tech companies have also sought to develop their own solutions. Facebook, for instance, published a white paper (Bickert 2020) in 2020 that highlighted four problems with internet regulation:

- The legal environment and speech standards differ worldwide, which can cause inconsistencies because the biggest tech companies operate internationally.
- Technology is constantly changing, as is speech.
- The implementation will always be imperfect because it has to be applied in many languages and dialects.
- Companies are merely intermediaries, not content creators.

On those bases, in 2020 Facebook announced the creation of an independent oversight board of recognized experts tasked with mitigating the enormous amount of problematic content. The board has been described as the company's in-house Supreme Court, and many have anticipated that the members' expertise would improve the quality of the company's decisions (Lendvai 2023b). However, in time, Facebook's first batch of decisions revealed that the sought-after solution was not found. Moreover, according to Kate Klonick (2021), the "star-studded panel and lavish funding will prevent regulation while allowing the company to outsource controversial decisions." A similar point was made by Laurence Tribe, that Facebook is "generating a patina of legitimacy that the board's composition or function cannot justify" (Morgan 2021). It is their shared view that Facebook's oversight board is merely designed to mislead the public—and even more so, U.S. and European politicians—and to serve as a distraction.

3.3. Expert recommendations on legislation

In Judit Bayer's (2019, 20–21) view, "Because of the international nature of the services, the regulation should take place at the supranational level of the EU and

extension of the rules to the global community should be sought." Bayer considers introducing a single but flexible concept necessary, which would greatly facilitate the unification and harmonization of legislation. Daphne Keller and Paddy Leerssen (2020, 223), meanwhile, have argued that content regulation should prevent harm, protect legitimate online speech, and support innovation. However, because those objectives are often presented in competing ways, they significantly undermine the willingness to regulate and, therefore, the effectiveness of regulation. Klonick (2020) envisages the solution as a public role for private actors, which permits big tech companies to do the dirty work of content regulation but also makes it mandatory for them to do so in view of the law.

Concerning the idea of a harmonized European legal system, Miriam Buiten, Alexandre de Streel, and Martin Peitz (2020) have noted that national liability rules are far more difficult to standardize than exceptions to liability. For that reason, they would expect voluntary proactivity by tech companies instead of monitoring certain uploaded content. Despite stressing that such proactivity should not mean a general obligation to monitor (Buiten, de Streel, and Peitz 2020), they do not cut the Gordian knot of Court of Justice of the European Union tied in *Glawischnig-Piesczek v. Facebook* (Gosztonyi 2020, 142–44). Their proposal echoes the suggestion of Natali Helberger, Jo Pierson, and Thomas Poell (2017), who advise shifting the emphasis from competitive responsibility to cooperative responsibility.

Among other expert recommendations, in 2019, four global entities—the United Nations Special Rapporteur on Freedom of Expression, the Organization for Security and Cooperation in Europe Special Rapporteur on Freedom of the Press, the Organization of American States Special Rapporteur on Freedom of Expression, and the African Commission on Human and Peoples' Rights Special Rapporteur on Freedom of Expression and Access to Information—issued a statement on the challenges for freedom of expression in the coming decade (OHCHR 2019). A core issue raised is the implementation of transparency and accountability requirements opposed to the privatized regulation and increasing transparency of content moderation by algorithms and artificial intelligence (OHCHR 2019).

3.4. Policy recommendations

The solution to the problem elaborated in this article—a complex framework combining legal, political, and economic aspects—remains to be established. As Paulina Wu (2015, 309) has described it, "Although private actors alone are insufficient for successful regulation, they must be included in the regulatory process," meaning that all three actors in the "platform governance triangle" need to be involved (Gorwa 2024). It is also clear from the practice of the international courts that large tech companies can no longer hide behind users, who increasingly do not produce content or conduct editorial activities. At the same time, the exponentially increasing amount of content can be controlled only by human moderators and AI with a view to proactivity.

Indeed, there is no ready or easy solution to such an enormously complex problem. Indeed, any legislation should be based on the following ten imperatives:

1. Respecting human rights and fundamental freedoms in the regulation and operation of the internet;
2. Respecting the characteristics of the internet as a complex, constantly changing, and diverse ecosystem, such that regulations have to be created "without destroying the massive benefits an open and diverse global internet can bring" (Suzor 2019, 114);
3. Ensuring the diversity, pluralism, and impartiality of content on the internet;
4. Ensuring the most comprehensive citizen, civil, and user participation in decision-making possible;
5. Facilitating cooperation between the parties involved and their radically greater transparency;
6. Hosting real tests of the effectiveness of different notification and content removal systems;
7. Precisely defining the active and passive roles of service providers (cf. Barata 2021);
8. Maintaining a general ban on monitoring to ensure freedom of expression and prevent excessive content removal;
9. Developing media literacy in all segments of society; and
10. Aiming overall to "deter unwanted speech but not to deter legal and socially valuable communications" (Sartor 2017, 12).

4. Conclusion

In this article, we have outlined the emergence, the historical and regulatory context, the content, and the future and possible development of the DSA. The DSA constitutes a notable attempt to address the concerns embedded within the ambit of platform governance in the European regulatory context. Its pronounced emphasis on transparency, accountability, and the attribution of responsibility delineates a promising framework for cultivating a more secure digital milieu. Nevertheless, as seen in this article's critical examination, the DSA also bears inherent limitations and raises questions regarding the pragmatic efficacy of legal instruments in combating the severe societal, psychological, and emotional harms inflicted by online abuse. Furthermore, apprehensions are rife concerning the practical implementation and potential inadvertent consequences associated with the DSA's provisions on content moderation and systemic risk assessment. Against that background, this article aims to contribute to the fruitful discussion on content moderation and scholarly research on platform governance, a subject just as prevalent to researchers as it is to users of online platforms.

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Integrating online simulations in business education: A case study on developing decision-making skills

This article presents a case study on how online simulation games impact decision-making skills in business education at the master's level, with particular focus on Budapest University of Business and Economics. Computer-based simulations that bridge the gap between theory and practice enhance employable skills such as teamwork, problem-solving, and communication. Despite challenges such as cost and alignment with course objectives, simulations are valuable when properly implemented and when instructors play a key role in mitigating obstacles such as computer anxiety. Simulations using the critical incident method are especially effective in promoting deep learning, encouraging reflection, and developing critical thinking amid uncertainty and under stress. Our findings show that well-designed simulations support the development of decision-making skills and critical thinking and offer a practical, engaging learning experience that benefits students' understanding of complex business scenarios.

Keywords: *online simulation game, business education, decision-making, employable skill, critical thinking*

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1. Introduction

In 2020, researchers in Hungary, after studying the use of technology in Hungarian higher education, determined that introducing and operating a hybrid system involving distance learning via digital means would be feasible (Majó-Petri et al. 2020). Although budgetary restrictions and instructors' inexperience would challenge that effort (Aczél 2017), other research has shown that the rewards would be worth it. Among other advantages, digital gamification not only supports employability (Fromann and Damsa 2018) but also highly motivates students (Baksáné Varga and Horánszky 2023). To realize those rewards, however, teachers would need to adopt appropriate pedagogical approaches (Muhi, Kőrösi and Esztelecki 2015).

The case study that we present in this article contributes to academic knowledge on using technology in Hungarian higher education, specifically by exploring how online simulation games support the development of business decision-making skills in business education at the postgraduate level. It examines how the instructors in the case integrated the simulation into a specific business course and how the students evaluated their learning experience. In this article, after reviewing the academic literature on the advantages and challenges of using online simulation games in higher education, we describe the course and the simulation game in the case. We next analyze the students' evaluations before presenting our conclusions and recommendations.

2. Literature review

Similar to non-computer-based simulations (e.g., role-play and board games), computer-based simulations (e.g., gaming simulations, training simulations, and modeling simulations) are used widely to support students' learning. In general, simulations in education attempt to imitate real-world phenomena and processes that are difficult for students to experience in real-world settings, mostly due to the risks, cost, or timescale involved. They support both deeper learning through repeated elements and the development of employable skills, especially self-management, teamwork, business awareness, problem-solving, and communication and literacy, including the application of information technology in the case of computer-based simulations. Another advantage of simulations is that they support students in making strong connections between theory and real-life contexts. At the same time, the related costs and other internal issues can be challenging for academic staff as they plan to implement online simulation games in their classes (Fitó-Bertran, Hernández-Lara and López 2015; Kuczera 2021; Lean et al. 2021).

Regarding the development of practical skills, simulations have been found to be highly efficient tools (Boon, Kok and Aziz 2019; Denisova et al. 2023; Tao, Yeh and Hung 2015). Online simulations, as every other type of technology-enhanced learning, prepare students for work in digital environments, but they are ultimately just tools. For that reason, academics play an important role in aligning simulations

with the requirements of their courses and supporting students' learning process by developing their confidence and professionalization (Bolton and Emery 2021). With a proper design and support from instructors, online simulation games offer benefits that outweigh any potential negative effects (Sequeira and Martins 2013). Among others, students' subject-level knowledge and experience with online games can mitigate any computer anxiety. In the process, instructors using simulation games should consider how to best weight game scores in assessment (Pina and Bordonaba-Juste 2018) and are advised to align the game with the course, as well as to ensure that the game's difficulty is neither too frustrating nor too easy for students (Matute-Vallejo and Melero-Polo 2019).

In studies on the successful deployment of online simulation games in higher education, students' satisfaction has emerged as being a key element. To that end, communication between learners and educators matters the most (Becirovic, Ahmetovic and Skopljak 2022). Online tools have also been found to be especially useful in reducing learners' mental and physical fatigue by breaking the monotony of traditional educational activities (Berezina et al. 2022). Dukalskaya and Tabueva (2022) have additionally argued that the optimal learning model for students' satisfaction combines a traditional approach and the use of digital technology. Beyond that, students appreciate being involved in solving a variety of tasks related to potential issues in the workplace. Role-play linked with technology can also be effective not only for developing various skills and personality characteristics but also in motivating and entertaining students. Such combinations of education and entertainment (i.e., "edutainment") holistically integrate pedagogical methods such as action-based learning, inquiry-based learning, and project-based learning (Gerasimova and Oblova 2023).

An important feature of online simulation games is *gamefulness*—that is, playability within the frame story—meaning that students need a certain level of freedom to act differently and to choose different strategies at every step (Ashworth 2010). For an online simulation to be effective, game design is paramount. From an educational standpoint, such games need to focus more on activating prior knowledge and putting that knowledge into practice than on the acquisition of novel knowledge. Striking a balance between gameplay and learning is also recommended, in which the latter should be supported by written and/or visual content instruction and regular feedback (Ke 2016). Online games can also be somewhat competitive so that learners are stimulated by competition with other learners, whether human or virtual (Labat 2008). On that count, intragroup competition has been found to be positively motivating, whereas an overly competitive learning environment can become detrimental. To avoid that situation, separating assessment from performance during the game is one possible solution (Whitton and Hynes 2006).

In online simulations, it is also possible to press pause, whether figuratively or quite literally, and step back from the situation in order to reflect on it or share feedback. A useful feature of online simulation games for business education in particular is the possibility to introduce critical incidents such as changes in

currency exchange rates or even a global crisis. Such critical incidents disrupt the decision-making process and prevent students from adopting routine approaches to decision-making by forcing them to reconsider their decisions (Lean et al. 2021). Online simulation games indeed provide effective platforms for applying that so-called critical incident method, which can stimulate learning by requiring reflection on what has happened and why. Critical incidents are unanticipated and can result in major changes, which can lead to transformational learning experiences. Combining online simulations with the critical incident method allows students to experience and reflect upon critical incidents in a safe environment, which results in impactful learning (Lean, Moizer and Newbery 2014). Despite those known benefits, the integration of online simulation games into education remains underexamined, and further investigation and experimentation are recommended (Tomatir 2021).

Delving further into business education, business simulation games have been found to greatly improve students' critical and higher-order thinking skills, including decision-making skills (Alkaabi 2022; Baena Rojas, Suárez Brito and López Caudana 2023; Dumblekar and Dhar 2021; Hernández-Lara, Serradell-López and Fitó-Bertran 2016). Such games have also been found to be particularly effective in developing decision-making skills regarding strategic and financial issues (Lai and Siau 2003). For strategic decision-making, simulations provide a competitive environment in which rival companies' decisions affect the planning and implementation of strategies selected by students. The software shows the results of decisions after each round, which subsequently need to be channeled into the decision-making process in the next round. Groupwork within the framework of business simulation games also provides opportunities to make decisions in various executive roles, which contributes to learning about consequences and taking responsibility for such decisions (Lean, Moizer and Newbery 2014; Schmuck 2021). The decisional alternatives offered by business simulation games additionally support the understanding of logical relations between variables that define typical managerial decisions and the scientific validation of decision-making (Maican and Lixandroiu 2011).

Today's global business arena calls for professionals who possess critical thinking skills, the ability to assess situations comprehensively, the motivation to consider and meet various requirements, and appropriate decision-making skills. In fact, employers and business partners expect those competencies from managers (Cruz-Sandoval et al. 2023; Dydrov and Salganova 2023). Decision-making in particular, regarded as a soft skill, is increasingly valued by employers; its development has thus become an important aim of higher education (Munkácsi and Városiné 2023).

On the topic of decision-making, there are situations involving uncertainty, stress, and risk in which the tasks of formulating strategies for action and communicating with others to coordinate the implementation of the strategies demand quick thinking. Traditional classroom learning does not provide the most suitable environment for developing decision-making skills needed to address complex, urgent business

problems. Indeed, facilitating that skill through teaching and learning activities in a classroom is not an easy undertaking, and replicating a complex, uncertain scenario in a traditional classroom is rarely achievable. By contrast, simulations, especially virtual ones, have been found to facilitate higher-level decision-making skills in educational contexts (Comfort and Wukich 2013). Instructors aiming to develop decision-making skills should know that active learning approaches are suitable to that aim, including having students work in small groups to discuss the context and he possible alternatives related to certain decisions, reflect on their own decision-making, and critically analyze the results of their decisions. That approach can support students in experimenting with rational as well as intuition-based decision-making, because in stressful situations people may indeed act on impulse (Greenbank 2010). A simulation game, however, helps students to appreciate the importance of informed decisions by integrating textbook knowledge into practical problem-solving (Liu and Olson 2011).

3. Materials and methods

The case study is a qualitative research methodology widely used in the social sciences and research on management due to offering a comprehensive view based on various techniques of data collection, including interviews and observations. According to Guzmán Barquet and Alejo Machado (2017), a *case study* is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between the phenomenon and context are not clearly evident. The methodology allows for a holistic understanding of phenomena within their real-life contexts, making it particularly valuable for practitioners exploring complex areas of research (Shishkov 2020; Stake and Visse 2022).

In the past forty years, case study research has evolved substantially and resulted in a pragmatic, flexible research approach that provides a comprehensive understanding of diverse issues across various disciplines (Harrison et al. 2017). Indeed, the applicability of the case study methodology spans numerous fields, including business, education, political science, and social work (Shishkov 2020). In practice, it allows an in-depth exploration and analysis of both successful and unsuccessful contexts in order to understand, for example, effective management strategies.

The suitability of case studies for testing theory, however, continues to be a subject of debate. Although some scholars have highlighted the weaknesses of the research design, its strengths, including providing detailed and contextual insights, are equally significant. The methodology has also demonstrated its capacity to yield rich, qualitative data—data that are crucial for developing theories in various domains of research (Løkke and Sørensen 2014). After all, theories emerge from empirical observations, which highlights the foundational role of case studies in research (Varela, Lopes and Rodrigues, 2020). In our study, to investigate decision-making

within the context of business simulation games, we performed a case study to analyze feedback derived from the coursework of postgraduate students.

Budapest University of Economics and Business (BUEB) launched the Sales and Operations Management course in Autumn 2023 as mandatory module of two master's programs: the MSc in International Business and Economy and the MSc in Marketing (BUEB 2024). Although both for full-time students, the former program was delivered in English, whereas the latter was delivered in Hungarian. The Sales and Operations Management course focused on sustainable business development related to managing sales and business operations in both languages.

The course was divided into two sections, with the first half of the semester focusing on organizational and strategic issues in sales and highlighting the key elements of the sales process. The second half transitioned to supply chain management and covered topics such as creating an effective supply chain, inventory management, related digital solutions, and agile innovation.

After an introductory overview on the expectations of businesses to act ethically, responsibly, and sustainably and of managers to prioritize generating stakeholder value, the course explored recent practices in managing sales and business operations. Lectures in the first half of the semester discussed the role of sales in the value chain while examining strategic issues such as market segmentation, targeting, and positioning. Students explored organizational structures that support effective sales processes and strategies for managing sales teams, and emphasis was placed on value-based selling and ethical sales practices that contribute to long-term customer satisfaction and loyalty. Lectures in the second half of the semester, by contrast, covered the design and management of supply chains that are both efficient and sustainable. Topics included supplier selection, logistics, and the integration of supply chain activities to optimize performance. Students learned about inventory management techniques that balance cost-efficiency with the need for responsiveness to market demands. The role of digital solutions in enhancing supply chain visibility and agility was also explored, especially while highlighting tools such as enterprise resource planning systems. The course concluded with a focus on agile innovation in operations management, which involved adopting flexible, iterative approaches to developing new products and services, thereby ensuring that businesses can quickly adapt to changes in the market environment.

During the seminars running in parallel with the lectures, students engaged in groupwork within the framework of an online simulation game. To bridge theory and practice, the teaching team employed the game Values-Based Management hosted by the platform EDUardo (EDUardo 2024) in competition mode, which allowed students to apply lecture content while confronting the complexities of value-based management in sales and business operations. The groups focused on the game and participated in the so-called decision rounds during weekly seminars, which were facilitated by the seminar leader faculty member. Although the assessment for the course included the game, grades were not related to the results achieved during the competition. The students worked in groups of three or four, made the decisions needed for the game together—the semester had 12 decision rounds total—and reflected on their groupwork and the connections between the

lectures and the game in writing at the end of the semester. The group reflection paper drew from individual input from each student, including feedback on the groupwork and on the individual contributions to decisions made during the game. The paper concluded with a group evaluation of the connections between the lectures and the game.

In total, 19 group reflection reports were submitted at the end of the semester: 13 groups completed the tasks in English and six groups completed the tasks in Hungarian. The students in the English-language groups studied in the International Business and Economy program in English and were from a variety of countries. The students in the Hungarian-language groups, by contrast, studied within the Marketing program in Hungarian and were from Hungary only. All students completing the online simulation game had previous academic experience in business and management, and the majority had professional experience as well.

We, the authors, two of whom were also involved in managing the online simulation game, analyzed the group reflection papers to scrutinize the students' decision-making processes, along with the outputs and charts generated during the game. Added to that, a semistructured interview was conducted with Péter Szlávik, founder and CEO of EDUardo, to inform our analysis even further. Ultimately, we aimed to answer two research questions:

1. How can an online business simulation game support the development of decision-making skills among business students?
2. How do postgraduate students evaluate their learning experience regarding how an online business simulation game supports the development of their decision-making skills?

4. Results

In Hungary, simulations have been available since the early 1990s and played an important role not only in higher education but also in entrepreneurial training. A semistructured online interview conducted with Péter Szlávik, founder and CEO of EDUardo, in March 2024 revealed that the company currently focuses on international markets and operates in many countries. EDUardo's business simulation games offer both single-player and multiplayer modes, including group options, and are designed to respond to unexpected events and assist participants in making entrepreneurial decisions and deriving lessons from them. Simulations model the effects of economic decisions and consider bankruptcy situations based on factors such as cash flow and asset availability. They also provide feedback to participants on the effects of their decisions, thereby offering opportunities to practice and learn from economic situations, including the opportunity to make mistakes freely, which is crucial for learning and development. They additionally provide information about the result of participants' decisions to the instructor via various charts, each displaying an important indicator of the group's performance over time.

For instance, the chart in Figure 1 indicates earnings before interest, taxes, depreciation, and amortization.

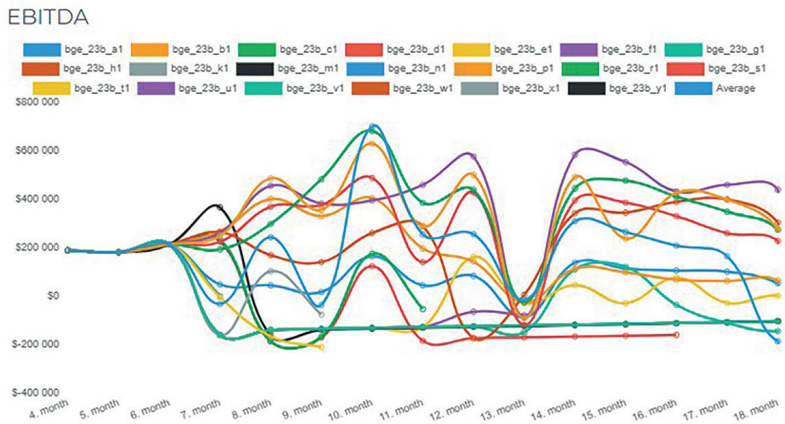

Figure 1. Results of earnings before interest, taxes, depreciation, and amortization (EBITDA) of master's student groups in the English-language Sales and Operations Management course at Budapest University of Economics and Business, Autumn 2023 (Source: EDUardo)

The instructors were provided with such charts after each decision round that covered a month in the simulation game. The chart showed whether a group went bankrupt due to their decisions (e.g., the green line falling flat in month 7), as well as the in-built market shock unexpected by the students (e.g., the sharp drop in each group's performance in month 13). The students received immediate feedback from the game after each decision round on various elements of their decisions, along with a sales summary (Figure 2).

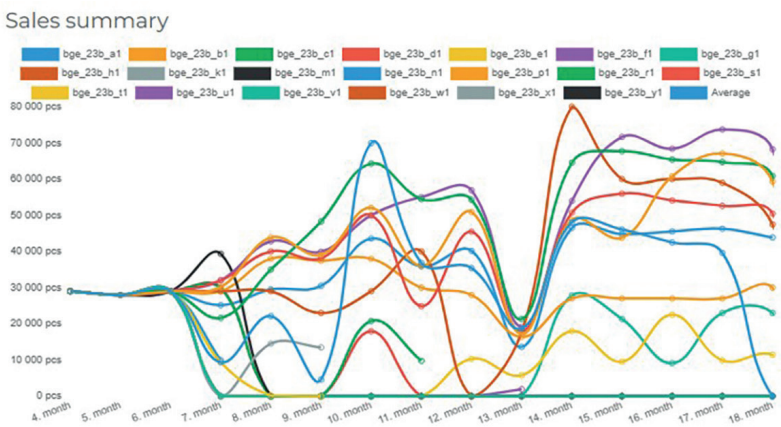

Figure 2. Sales summary of master's student groups in the English-language Sales and Operations Management course at Budapest University of Economics and Business, Autumn 2023 (Source: EDUardo)

The simulation game differentiated four types of customers and showed the total number of products sold in each segment by the companies. The relevant results of the decision rounds were also shown to students and instructors (Figure 3).

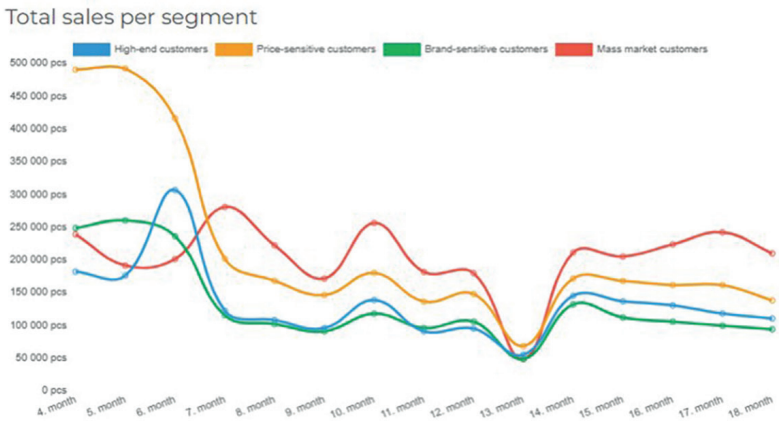

Figure 3. Total number of products sold in each segment by the companies (Source: EDUardo)

Although the charts continually informed the instructors about the results of the decisions made by students, the details of the decision-making process, including individual contributions and reasons for actions, were not displayed by the game. The group reflection papers were analyzed to clarify those elements.

Students studying in English held regular team meetings to exchange ideas and clarify roles. Those meetings were held both before and after decision rounds with the aim to identify business scenarios and make educated, timely decisions. The meetings were enhanced by the simulation's feedback mechanism, which enabled teams to adjust strategies quickly based on performance metrics and market information provided by the simulation software. The students emphasized the importance of handling unforeseen challenges, considering various risks, and adapting to changing market conditions. They also mentioned flexibility and the need to take a holistic approach to decision-making that considers multiple business aspects, from sales and marketing to production and human resources.

The decisions made by students studying the course in Hungarian were also grounded in thorough market analysis while taking into account both competitors' actions and their own market position. For instance, one student chose to keep prices below competitors' levels while allocating more funds to marketing. Another participant chose to respond to market fluctuations by enhancing the perception of products while reducing production losses. Several students also highlighted the critical importance of workforce management. For example, one student emphasized the necessity of maintaining adequate staffing levels to meet production goals; in one instance, excessive layoffs led to insufficient product output, which resulted in a shortage of demand in the market. The students also actively managed

finances, including revenue, costs, investments, and profits. One student referred to a challenge faced when loan repayments could not be met due to a failure to achieve planned sales quantities, which caused financial difficulties for the company. Others highlighted sales strategies aimed at increasing product awareness and catering to various market segments, including efforts to focus marketing on premium and brand-sensitive consumers.

Throughout their reflections, students examined various aspects of decision-making strategies, evaluated options, and responded to changes in the simulation environment. Examples from the simulation game illustrate their collaborative decision-making processes, strategic analyses based on competitor actions, and consideration of long-term impacts in their strategies. When faced with outcomes that did not meet expectations, they engaged in strategic re-evaluation and adjustments, including by revising pricing strategies and introducing alternative marketing approaches.

5. Discussion

The group reflection papers and the experiences of the instructors confirmed several issues in the academic literature that we reviewed. Overall, the students enjoyed the simulation game, appreciated its gamefulness, and found it engaging and relevant to the course. The situations in the game that mimicked real-life moments in the business world helped the students to learn more about competitive markets and associated periods of uncertainty and stress when significant decisions have to be made. Successful groups tended to avoid impulsive decision-making by instead relying on putting the strategies learned during lectures into practice. Some students emphasized that even though it was just a game, the stress caused by bankruptcy was indeed a shocking learning experience that they would not like to have in their careers.

Another common element that the participants all mentioned was the game's built-in market shock. Such a critical incident, as the literature also highlights, was a truly eye-opening experience for many students. Just when they had just gotten used to the complexity of decision-making involving the consideration of competitors, marketing activities, financial implications, and workforce issues, the market shock forced them out of their comfort zones and routine decision-making. It also helped them to connect the lectures with real-life practice.

The instructors took the risk of incorporating such a complex simulation game into their course knowing that the game immediately demanded consideration of various topics that would not be discussed until later in the semester. Nevertheless, due to their previous studies and work experiences, the master's students were able to grasp the gist of the complexity of the strategic decision-making process from the very beginning and accepted that certain issues would be clarified weeks later when the respective topic was discussed during a lecture. The instructors also considered the recommendation of researchers and excluded the simulation game's results from assessment. In that way, the stress related to the game did not exacerbate the

usual anxiety about assessment, and participation in the game was a very positive learning experience for the students, as the end-of-semester student satisfaction survey confirmed.

6. Limitations

Because we conducted a case study, the results need to be primarily interpreted in the context of the Sales and Operations Management course, as a mandatory module of two full-time postgraduate programs at BUEB: the MSc International Business and Economy program in English and the MSc Marketing program in Hungarian. It was the first time that the course ran with a 60-student cohort. As mentioned, the students in the International Business and Economy program were from a variety of countries. All students completing the online simulation game had previous academic experience in business and management, and the majority had work experience as well. Another important limitation to note is that our qualitative research did not focus on any specific decision-making skill, nor did it aim to measure changes in the students' performance related to the course objectives. The role of instructors in aligning the course with any simulation game incorporated, including detailed and constant communication with their students, was also an important factor to be considered. Last, an important caveat is the online simulation game played by the participants; although EDUardo's Values-Based Management online simulation game exhibits all the positive characteristics described by researchers, it is not necessarily appropriate for every postgraduate business and management course.

7. Conclusion

Today's business environment demands that companies operate ethically, responsibly, and sustainably. Managers are expected to generate value for stakeholders while maintaining a balance between profitability and social responsibility. The Sales and Operations Management course at BUEB addresses those expectations by providing students in the MSc International Business and Economy and the MSc Marketing programs with a comprehensive understanding of contemporary practices in sales and business operations.

Our qualitative research, based on a case study, aimed to explore how an online business simulation game can support the development of business students' decision-making skills and how postgraduate participants evaluate their learning experience in that context. In line with relevant academic literature, the selected online simulation game facilitated an engaging learning experience in which the alignment of course goals, the game's complexity and gamefulness, and the exclusion of the game's results from assessment were all important factors. The group reflection papers submitted by the participating students at the end of the semester confirmed that an online simulation game can be instrumental for practicing quick, complex decision-making and thus for preparing students for success in the global business

arena. Another academic paper examining the students' experiences and how the business simulation game contributed to the development of their teamwork skills is planned for future publication.

Ethics statement

The publication of the study's results has been done responsibly and without violating personal rights, honor, or reputation. Participation in the study by students at BUEB was voluntary; their informed consent was collected, and their personal data were protected. Compliance with scientific ethics standards was ensured by following the Hungarian Academy of Sciences' Code of Scientific Ethics, while the protection of personal rights and the handling of personal data were done in accordance with the regulations laid out in the "General Rules and Certain Personal Rights" of Act V of 2013, the Civil Code, as well as BUEB's policy related to data management.

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